PTV Visum 2022 Release Notes

PTV | GROUP

Last modified: 2022-08-15

2022.01-11 [248071]	**2022-08-15**

⊕ New Features and Changes

Demand Procedures

⊕ Boarding and alighting stops at trips in the ABM example: The code of the ABM example has been changed so that the boarding and alighting stop of the public transport path used is now also issued at trips as a user-defined attribute. **(23830)**

Dialogs

⊕ License management improvements: The settings for license servers and license containers have been moved from the 'License management' dialog to a separate settings dialog. The new dialog provides extended functions, especially for containers. **(24318)**

I/O Interfaces

⊕ Order of imported line routes for PuT supply from Visum: The import of a PuT supply from Visum now imports the line routes in the order of the average distance between the relevant locations (depending on the option stop point, nodes and intermediate points of links), i.e. line routes whose route course is determined very precisely by many relevant locations are imported first. This is relevant because the evaluation of subsequent routes takes into account the route courses of the already existing line routes. **(24348)**

Installation

⊕ Academic packages as product variants: Academic licenses are now configured differently than before. **(24428)**
⊕ Update CodeMeter Runtime: The CodeMeter Runtime deployed with PTV Visum has been updated to CodeMeter 7.50. **(24421)**

✅ Fixed Bugs

COM-API

✅ Changed entry address at IVisum: Because of the changed entry addresses at the object IVisum applications that integrate Visum using Early Binding no longer ran. This error has been fixed, i.e. the same entry addresses are used again as in PTV Visum 2022.1-9. **(24304)**
✅ Return value of Add...Condition methods at filters invalid: The ICondition type object returned by the various Add...Condition methods at a COM filter object (IGroupElementFilter, IODPairFilter, IDirectedFilter, ICategoryFilter, IConditions, or ISingleFilter), which represents the filter condition just inserted, could not be adequately used because accessing it always resulted in an error message. This error has been fixed. **(24317)**
✅ Shortening of a line route deletes the route course: If one of the two ending line route elements were not specified when calling the ILineRoute.Shorten method, the complete course of the line route was deleted instead of taking the line route from its start or to its end. This error has been fixed. **(24349)**

Data Model

✅ Crash after deleting stages: Crashes no longer occur when accessing the data of stages of a signal controller of the type 'Vissig stage-based' (e.g. allocating a signal group to a stage) if a stage of this signal controller has been deleted beforehand. **(24206)**
✅ Deleting a node results in invalid PrT paths: Deleting a node could result in invalid (userdefined) PrT paths. This error has been fixed. **(24351)**
✅ Incorrect setting of day index for time intervals: If a time interval ended at 24h, setting the day index in networks with a calendar caused the end of the time interval to be set to 0h on the new calendar day and thus before the start time. This error has been fixed. **(24265)**

Demand Procedures

- Crash when outputting path sequences in the Tour-based model: No more crashes when executing the 'Tour-based model - Combined trip distribution/mode choice' procedure if it outputs path sequences with a partitioning size (= number of persons represented by a path sequence) greater than 1. **(24332)**

Dialogs

- Access node of a stop area is not drawn as marked: When allocating an access node via the search in stop area dialog, the node selected was not drawn as marked in the network. This error has been fixed. **(24325)**
- Crash when creating a From-to zone based fare: No crash when creating a From-to zone based fare in the dialog 'Edit ticket type' if the fare is already complete, i.e. an entry already exists for all combinations of fare zones. **(24345)**
- Crash when exiting the WMS dialog: A crash no longer occurs when exiting the 'WMS map layer' dialog via the OK button if no connection has been created or selected yet. **(24301)**
- Problems in the 'Vissig - Signal controller' dialog: When opening the 'Vissig - Signal controller' dialog, problems occurred if the signal controller had no signal program or a faulty one. This error has been fixed. Furthermore, the menu entry for intermediate saving was misleading and has been removed, since the signal program is always saved when the dialog is closed. **(24310)**

Formulas

- Forbidden network object types in TableLookup: In the TableLookup function, only those network object types can be used where the concrete objects can be enumerated. However, the formula editor also provided non-enumerable network object types, and a formula using them was considered syntactically correct. This error has been fixed. **(23022)**

Graphical Procedures

- Public transport flow bundles for zone conditions with limited supply: The meaning of a PuT flow bundle condition for an origin/destination zone with limited supply was not consistently defined with regard to transport systems of type PuTWalk. This has changed. The condition is checked if PuTWalk is not allowed, but a link has been used for the access or egress. An access or egress is not considered as footpath if only connectors or walk links between stop areas within a stop have been used. **(24269)**

I/O Interfaces

- Export to PTV Visum Publisher does not work with Proxy: Export to PTV Visum Publisher did not work if a proxy server with authentication was used for network communication. This error has been fixed. **(24360)**
- Number of lanes when importing OpenStreetMap: If a link in the OSM data has different numbers of lanes for one direction and the opposite direction, the link attribute Number of lanes was allocated incorrectly. In particular, the import could fail in certain cases. This error has been fixed. **(24387)**
- Runtime in PuT updater too long: In certain constellations, the runtime of the import 'PuT supply from Visum' was unnecessarily long and has been accelerated. **(24209)**

Junction Editor

- Closed links visible in overview mode: In overview mode, i.e. when zoomed out quite far, closed links were visible in the Junction Editor (which were invisible in detail mode). This bug has been fixed. **(24044)**
- Lane markings incorrect in case of left-hand traffic: In the case of left-hand traffic, some lane markings were drawn incorrectly in the Junction editor. This bug has been fixed. **(24237)**
- Options 'Leg template definition' and 'Define geometry template' missing: In the geometry view of the junction editor, the options 'Leg template definition' and 'Define geometry template' were missing in context menus. These are now restored. **(24257)**
- Time scale of the signal timing view with offset: In the signal timing view, all auxiliary lines are displayed at intervals of 5s. However, this time scale started with the offset and not at zero. With an offset of e.g. 3s, the times 3s, 8s, 13s, and so on were thus displayed. This error has been corrected. **(24274)**
- Problems in the 'Vissig - Signal controller' dialog: When opening the 'Vissig - Signal controller' dialog, problems occurred if the signal controller had no signal program or a faulty one. This error has been fixed. Furthermore, the menu entry for intermediate saving was misleading and has been removed, since the signal program is always saved when the dialog is closed. **(24310)**

Line Route Editor

- Crash when entering multiple run times: Crashes no longer occur when entering a value for a (run or stop) time in a marked section that includes cells in rows that are not profile points. **(24106)**

Main Window

- Visum freezes on certain actions: On some computers, Visum seemed to freeze during certain actions (e.g. 'Network new' or loading a version file). This error has been fixed. **(24379)**

Matrix Editor

- Crash during projection by territory: A crash no longer occurs during territory-based projections if the projection matrix and the target matrix have different dimensions. **(24339)**

PrT Assignment

- Crash in SBA for links without lanes: Crashes no longer occur in the calculation of the simulation-based dynamic assignment (SBA) if there are links with no lanes in the network. **(24352)**
- Termination of SBA assignment with a separate turn for public transport: Simulation-based dynamic assignment (SBA) no longer terminates if there is a separate turn in the network at a link that is open only to PuT transport systems, and vehicle trajectories are recorded for visualization during assignment. **(24239)**

Visum Files

- Messages for invalid aliases: When opening version files, messages were previously issued for invalid aliases, i.e. for aliases that refer to a currently non-existing attribute (e.g. a former user-defined attribute or a missing subattribute specification). However, such aliases may exist and should therefore not lead to warnings during import. This bug has been fixed. **(24346)**
- Sporadic crash during reading of version files: No more sporadic crashes during reading of version files containing PuT path lists and/or PuT path leg lists. **(24366)**

2022.01-10 [246049]

2022-06-27

✓ Fixed Bugs

COM-API

- Start of Python interpreter sets LC_CTYPE: The start of the Python interpreter in Visum changed the LC_CTYPE, i.e. a language setting with influence on the interpretation of strings. This could cause undesired behavior in executed script code. This bug has been fixed. **(24222)**

Data Model

- Crash when accessing attribute 'SBA simulation detail tCur-PrTSys' of links: A crash no longer occurs when accessing the attribute 'SBA simulation detail tCur-PrTSys' of links if it is not calculated for all PrT transport systems. **(24146)**
- Deleting temporary attributes: When deleting the definition of a temporary attribute, values of other temporary attributes at other network object types were sometimes deleted as well. This error has been fixed. **(24255)**

Demand Procedures

- Crash in case of tour-based model with output of path sequences with temporal distribution: A crash no longer occurs when executing the procedure 'Tour-based model - Combined trip distribution / mode choice' if the output of path sequences with departure times is requested, but the procedure is not executed for all demand strata of a person group. The calculation, however, is still not possible in this constellation, because the time series refer to activity transitions per person group and thus do not provide useful information for a subset. **(24140)**

Dialogs

- Column widths for tables in resizable dialogs: The column widths of tables in resizable dialogs were adjusted inaccurately so far so that the last column tended to become wider and wider. This effect was clearly visible, for example, in the Lines / Line routes floating dialog. This bug has been fixed. **(24251)**
- Missing placeholders for API and AI attributes in attribute selection dialog: If an attribute with the subattribute type API or AI with a placeholder for the subattribute dimension should be referenced when editing the determining formula of a formula attribute with subattribute AHPI, this option was not provided in the attribute selection dialog. This bug has been fixed. **(24165)**

Filters

⊘ Deleting the first condition led to invalid state: After deleting the first condition (row) of a filter, the affected filter was in an invalid state. If a filter file or a version file was then saved, the filter file could no longer be loaded. When loading the version file in this case, the filter settings were skipped. This error has been fixed. **(24186)**

Formulas

⊘ Warning about invalid formulas when loading version files: Previously, when loading a version file, no warnings were issued if it contained invalid formula attributes. This bug has been fixed. **(23801)**

I/O Interfaces

⊘ Crash when importing VDV with line blocks: Crashes no longer occur when importing VDV452 data with line blocks if the vehicle types can be imported. **(24192)**

Installation

⊘ Export to Publisher not possible if .Net Core Runtime is installed during installation: If a current .Net Core Runtime was already installed when a setup was installed, the export of data to PTV Visum Publisher did not succeed afterwards. This error has been fixed. To fix this error, a setup must be run again - the update is not sufficient in this case. **(24156)**

Junction Editor

⊘ Closing of turns via Del key not possible: In the Junction editor's turns view, it was no longer possible to close marked turns by pressing the Del key. This bug has been fixed. **(23549)**

⊘ Lane marking does not update: The marking of lanes displayed in the junction editor did not change when editing the type number of a turn (and thus its direction in terms of the arrow). This error has been corrected. **(24157)**

Lists

⊘ Crash when entering an undefined matrix reference as filter of the matrix list: Crashes no longer occur when entering an undefined matrix reference (e.g. "Matrix([CODE])") in the matrix list filter. **(24024)**

⊘ Error message when transferring data to user-defined table: When transferring data from the marked area of a list to a user-defined table, an invalid error message was displayed when the operation was canceled by the user. This error has been fixed. **(24154)**

⊘ List unusable after deleting a temporary attribute: If a list contained an attribute that displayed the values of temporary attributes when they existed, this list became unusable when the temporary attribute (i.e. the definition, not the individual values) was deleted. As a result, attributes could no longer be added to or removed from the list. This bug has been fixed. **(24025)**

Network Comparisons

⊘ Crash when loading model transfer file that deletes a stop at which line routes start or end: A crash no longer occurs when loading a model transfer file or applying a modification that deletes a stop at which line routes start or end. **(24173)**

Network Editor

⊘ Actions in spatial selection do not affect locations: In the 'Spatial selection mode' of the network editor, actions such as 'Include all objects in spatial selection', 'Remove all objects from selection', or 'Invert spacial selection' did not take effect on locations. This bug has been fixed. **(24090)**

⊘ Incorrect adjustment of t0 for turns when reallocating links: When a link was reallocated from one node to another that was connected to the first one by a link, the travel times t0 for turns at the new node that were not related to the reallocated link were increased. This bug has been fixed. **(23474)**

PrT Assignment

⊘ Crash in ICA calculation for nodes with two-way stops according to HCM 7: A crash no longer occurs in ICA calculations for nodes with two-way stops according to HCM 7 for nodes that have a major flow leg without a straight turn. **(24175)**

⊘ Crash in equilibrium assignment when using existing results: A crash of the equilibrium assignment no longer occurs when using an existing assignment result as starting solution, if network objects are loaded in the assignment that previously had no volume. **(24227)**

- ✅ Crash of equilibrium assignment in case of subnormal demand: The classic equilibrium assignment no longer crashes if the demand of an origin-destination relation is a subnormal number, i.e. a value so small that it can no longer be represented by the normal range of values of floating-point numbers. The demand of such relations is now treated as 0. **(24120)**
- ✅ Extended route import slow in case of empty values for time intervals: The extended route import of a *.rim file was too slow if there were empty values for individual time intervals in the VOLVEH_DSEG column of the $Route table. This error has been fixed. **(24240)**
- ✅ Number of paths missing in equilibrium assignment: After executing the equilibrium assignment, the value for the number of paths per iteration was missing in the 'PrT assignment quality data' list. This error has been fixed. **(24217)**

PuT Assignment

- ✅ Crash on network changes related to sharing: A crash no longer occurs when making network changes, e.g. creating zones, if there is a public transport assignment result in the network that uses sharing transport systems. **(24034)**
- ✅ Memory consumption for transfer passengers: The memory consumption of the data structure for PuT transfer passengers has been significantly reduced in certain cases. **(24136)**

PuT Operating Indicators, Visum Files

- ✅ Saving and loading version files for results at vehicle journey items with subattribute vehicle combination: Saving and loading version files with results at vehicle journey items with subattribute vehicle combination was unnecessarily slow and has been accelerated. **(24193)**

Scenario Management

- ✅ Crash when loading model transfer file that deletes a stop at which line routes start or end: A crash no longer occurs when loading a model transfer file or applying a modification that deletes a stop at which line routes start or end. **(24173)**
- ✅ Relation of location to activity executions not correct after loading model transfer files: When an activity execution in a model transfer file was changed in such a way that it referred to another location, the relation from the location to the activity executions carried out there was subsequently no longer displayed correctly. This error has been fixed. **(24163)**

Timetable Editor

- ✅ Finding lines in line selection: An entry in the search field of the line selection dialog opened from the timetable lines tool window never resulted in any matches in the displayed line structure, i.e. no entry of the structure was marked. This bug has been fixed. **(24229)**

Visum Files

- ✅ Crash when saving version after inserting a PuT TSys: A crash no longer occurs in certain cases when saving a version file after previously creating a PuT transport system. **(23910)**
- ✅ Faster saving of text files to network drives: Saving text files (network file, attribute file, model transfer file) to network drives was unnecessarily slow and has been accelerated. **(23629)**
- ✅ Loading a global layout changes history: Loading a global layout file resulted in entries in the history that looked as if the import could be undone, which is neither intended nor possible. This error has been corrected, i.e. no entry is now created in the history. **(23447)**
- ✅ Relation of location to activity executions not correct after loading model transfer files: When an activity execution in a model transfer file was changed in such a way that it referred to another location, the relation from the location to the activity executions carried out there was subsequently no longer displayed correctly. This error has been fixed. **(24163)**

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<tr><td>**2022.01-09   [244741]**</td><td>**2022-05-27**</td></tr>
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⊕ New Features and Changes

Demand Procedures

- ⊕ ABM example improved: The description of the ABM example now shows in more detail how to run the example for debugging from outside via run_abm.py. **(24116)**
- ⊕ Use of tCur instead of t0 for PrT trips in the ABM example: For shortest path searches in mode choice, tCur is now used as impedance in the ABM example instead of t0. **(24020)**

I/O Interfaces

⊕ Position of transferred stops and stop areas in PuT updater: If a stop point and its stop area and stop are transferred when importing a PuT supply from Visum ('PuT updater'), these are now no longer moved to the position of the stop point in the target network, but keep their position as in the source network. **(23609)**

Installation

⊕ Update CodeMeter Runtime: The CodeMeter Runtime deployed with PTV Visum has been updated to CodeMeter 7.40b. **(23809)**

Junction Editor

⊕ Check function for finding links with problematic geometry: A new function allows finding and repairing links whose intermediate points are located in the junction or roundabout area of an adjacent node or main node. Such links cause a problematic display in the Junction editor as well as during ANM export to Vissim. The repair involves removing the intermediate points lying in the junction area, if possible while maintaining the angle at the node. For one thing, the check function is accessible for all nodes and main nodes in the network via the 'Network check'. Apart from that, it provides information on the currently marked node or main node in the Junction editor. **(23091)**

⊕ Function for recalculating link orientations: In the Junction editor, the new 'Recalculate link orientations' function is supplied in the shortcut menu of a node or main node. This is independent of whether the orientations were set automatically or manually, and it always merges links into legs, if this is possible. If the new orientations correspond to the previous ones, the node geometry is retained, otherwise it is discarded and recreated (as default geometry). In PTV Visum 2023, the similar special function at links is no longer available. **(22550)**

⊕ Improved geometry of main nodes: The calculation of the geometry of main nodes has been improved so that a reasonable display is achieved in some previously problematic cases. **(23409)**

⊕ Many shortcut menu actions from the geometry view also available in the table: In the Junction editor, actions from the geometry view's shortcut menu are also supplied in the tables at the bottom of the Junction editor, as long as no mouse position within the concrete geometry needs to be evaluated for meaningful execution. **(23633)**

⊕ Vissim node preview updated: The Vissim node preview has been updated to version PTV Vissim 2022.0-5. **(23985)**

Network Editor

⊕ Check function for finding links with problematic geometry: A new function allows finding and repairing links whose intermediate points are located in the junction or roundabout area of an adjacent node or main node. Such links cause a problematic display in the Junction editor as well as during ANM export to Vissim. The repair involves removing the intermediate points lying in the junction area, if possible while maintaining the angle at the node. For one thing, the check function is accessible for all nodes and main nodes in the network via the 'Network check'. Apart from that, it provides information on the currently marked node or main node in the Junction editor. **(23091)**

✓ Fixed Bugs

Add-Ins

✓ 'Demand Calibration' defined output matrices incorrectly: The add-in 'Demand Calibration' did not define the output matrices correctly, so that a run together with tour-based models led to an error message. This error has been fixed. **(24048)**

Demand Procedures

✓ ABM example does not run with feedback: The ABM example could not run in feedback mode. This error has been corrected. **(24115)**

Dialogs

✓ Formulas for user-defined skims PrT incorrect: In the 'User-defined skim PrT' dialog, the formula displayed on the buttons showed the wrong operator. This error has been fixed. **(24085)**

✓ Missing translation in PrT impedance definition: The table headings of the table for defining the impedance per PrT transport system in the general procedure parameters were not translated into the set interface language. This error has been fixed. **(23982)**

✓ Too many warnings in the PuT skim calculation dialog: If no file name was indicated for skim matrix files to be written, a warning was issued for each individual skim when activating the export to file. This error has been fixed. **(24095)**

Graphical Procedures

✅ Handling of paths from passenger surveys in the flow bundle: Paths that originated from plausible passenger survey data were handled incorrectly in the flow bundle, depending on the level at which conditions were set: When conditions were set at active time profiles, implausible paths were also contained in the flow bundle, but when conditions were set at active vehicle journeys, plausible paths were never contained in the flow bundle. This error has been fixed, i.e. implausible paths are generally not included in the result of the flow bundle, and plausible paths are always included if they fulfill the set condition, regardless of the logical level of the condition. **(23996)**

Graphics

✅ Crash when printing symbols at the margin: No more crashes when printing with Microsoft PrintToPDF or with the XPS Writer if a symbol is cut off at the side and at the top. This case occurred naturally more often with tiled printing. **(24031)**

I/O Interfaces

✅ Couplings without a common valid day in the coupling area during HAFAS import: During HAFAS imports, couplings could in rare cases be formed between vehicle journeys that did not have a common valid day in the coupling area. This was caused by a change of the valid day of at least one of the two vehicle journeys in the coupling area. This error has been fixed. **(23662)**

✅ Renaming a model in PTV Visum Publisher did not work: Renaming a model in the selected product instance of PTV Visum Publisher via the editing symbol did not work. This error has been fixed. **(24096)**

✅ Shapefile export to network drive too slow: The shapefile export was too slow when the destination file was not on a local directory but on a network drive. This error has been fixed. **(23623)**

✅ Trajectory export without time restriction to PTV Visum Publisher: If no time restriction (i.e. export for the entire analysis period) was set when exporting vehicle journeys as trajectories to PTV Visum Publisher, only the period from 08:00 to 09:00 on the first day of the analysis period was exported. This error has been fixed. **(24058)**

Junction Editor

✅ Crash when inserting a polygon point into a link displayed as a Bezier curve: A crash no longer occurs when inserting a polygon point via the shortcut menu in the Junction editor in a link that has no intermediate points so far and is displayed as a Bezier curve due to a lateral leg offset at one end. **(24045)**

✅ Panning could lead to empty geometry view: When moving the image section in the geometry view, a state could occur where the view remained empty. This bug has been fixed. **(23975)**

Main Window

✅ Crash when executing 'Network check' function 'Access and egress at inaccessible stop points': Crashes no longer occur when executing the 'Network check' function 'Access and egress at inaccessible stop points' if the checked mode includes PuT Aux transport systems. **(24118)**

✅ Possible crash after opening a global layout: After opening a global layout file in which extracted views (e.g. a list) were defined, depending on the monitor settings, a state could occur in which actions that were not allowed could be executed (e.g. opening further global layouts). If these were executed, the program crashed. This error has been fixed. **(24075)**

✅ Visum did not start because of add-ins: In certain constellations of registry entries for the script menu and add-ins at different positions in the file system, it could happen that PTV Visum terminated immediately after being started without the main window becoming visible. This error has been fixed. **(24023)**

PrT Assignment

✅ Incorrect check when switching between signal programs: If, as part of a simulation-based dynamic assignment, a switch takes place at a signal controller as part of the daily signal program list, a check is made to see whether the signal state before and after the switching match. This check was faulty if the switching time of the initial program had the value 0, i.e. incorrect transitions were not noticed. This error has been fixed. **(24060)**

✅ Node impedance calculation according to HCM7 for split straight/left turns: The calculation of the impedance for split straight/left turns on the major flow at two-way nodes was incorrect if there was no volume on the straight turn. This error has been fixed. **(24126** ⛔**)**

✅ Skims trip distance, v0, and vCur wrong in SBA with MPA: If in a simulation-based dynamic assignment (SBA) the distribution of demand to shares of each OD pair (MPA) was used, the skim matrices trip distance, v0, and vCur derived from the assignment result contained wrong values. This error has been fixed. **(24091)**

✅ Using existing results with changed demand fails in case of insufficient capacity: When using an existing PrT assignment result for an OD pair for which there was demand but no paths from the existing assignment, if there were only paths with very high impedance due to insufficient capacity, a calculation based existing results was not possible. This bug has been fixed. **(24110)**

PuT Operating Indicators

✅ Reduction of memory requirements for results at vehicle journey items with subattribute vehicle combination: If the indicators for vehicle journey items were also calculated as part of the calculation of PuT operating indicators, this required an unnecessarily large amount of memory in networks with a lot of vehicle combinations, and the writing and reading of version files with such result data was also unnecessarily slow. This error has been corrected. **(23790)**

Scenario Management

✅ Problem with changes of transport system sets of links with strict link type: In connection with strict link types, incorrect transport system sets of links could occur when applying model transfer files (or modifications in scenario management projects). This error has been fixed. **(23818)**

Timetable Editor

✅ Display of system valid days at the edge of the calendar: If a system valid day used in the line block editor to describe the valid day of a display level only contained valid days in the first, incomplete week of the calendar, its day pattern was previously displayed as '0000000'. Now, in this case, the actual pattern in the incomplete first week is used, filled in front by '0'. **(23946)**

✅ Tree view in line block selection does not adapt to data changes: The tree view in the tool window 'Line block selection', which is part of the line block editor, was not updated when changes were made to the data, e.g. the vehicle combination of a line block. As a result, a crash could also occur when actions were performed on line blocks that, according to the current data, should have been placed at a different path in the tree. This error has been fixed. **(23948)**

Visum Files

✅ Problem with changes of transport system sets of links with strict link type: In connection with strict link types, incorrect transport system sets of links could occur when applying model transfer files (or modifications in scenario management projects). This error has been fixed. **(23818)**

⛔ Breaking Changes

PrT Assignment

⛔ Node impedance calculation according to HCM7 for split straight/left turns: The calculation of the impedance for split straight/left turns on the major flow at two-way nodes was incorrect if there was no volume on the straight turn. This error has been fixed. This changes the results of the assignment with ICA in affected networks. **(24126 ✅)**

2022.01-08 [243273]   2022-04-26

➕ New Features and Changes

COM-API

➕ Setting multiple reference objects for lists: At the user interface, the lists for line route items, time profile items, vehicle journey items, connecting journeys, planned connecting journeys, and arrivals/departures can have multiple reference objects, but until now only one (or no) reference object could be set via COM. Now, for these lists, multiple reference objects can also be set via COM by indicating an array of objects or keys for the VARIANT parameter at the SetObjects method corresponding to the list's reference object. It is not possible to specify a network object container: in this case, the GetAll property must be used at the container, which returns an array of objects. **(21408)**

Miscellaneous

➕ French help: The French help (online & PDF) has been updated to PTV Visum 2021. Also, the PTV Vision license management help is available in French at: https://cgi.ptvgroup.com/vision-help/LicenseMgt_FRA/Content/0_TitelCopyright/Index.htm. **(23999)**

✅ Fixed Bugs

ANM

✅ ANM export failed if there was a common signal controller for several nodes: ANM export failed if there were multiple nodes / main nodes in the network that were allocated to the same signal controller. This error has been fixed. **(24022)**

Add-Ins

✅ Wrong error message for distribution parameter c in 'Demand Calibration': The 'Demand Calibration' add-in sometimes issued an incorrect error message regarding the sign of the distribution parameter 'c'. This error has been fixed. **(23787)**

Data Model

✅ Green times of stages incorrect for intergreens of length 0: The green times of stages of a stage-based signal controller were sometimes output incorrectly if there were intergreens of duration 0s or if intergreens overlapped. This error has been fixed. **(23979)**

Data Model, Lists

✅ Display of temporary attributes in list empty: If an attribute of a network object type was specified as a temporary attribute and no network object existed yet for which this attribute had a temporary value, a list opened at that time for the network object type with a column for the XML representation of the value showed nothing in this column, even if temporary values were subsequently created. This error has been fixed. **(23931)**

Dialogs

✅ Crash when editing graphic parameters for route courses: More complex editing of graphic parameters for route courses, dialog page 'Display', could cause a crash. This error has been fixed. **(23551)**

✅ Creating user-defined attributes in the context of procedure parameters dialogs: If a user-defined attribute was created in a procedure parameters dialog that contained an attribute selection (e.g., the selection of the attribute for the capacity of a P+R lot in the context of the procedure 'P+R lot choice'), this attribute was subsequently not available. In certain contexts, e.g. matrix references, this could also cause a crash. This error has been fixed. **(23727)**

✅ Optimal column width incorrect for combined columns: The calculation of the optimal column width was incorrect for cells or columns where an input field or a labeled button is combined with another control (common case: The '...' button for an attribute or file selection). This was particularly noticeable in the 'Project directories' dialog, for example. This error has been fixed. **(12466)**

Filters

✅ Crash when activating a filter: In certain situations, a crash could occur when activating the link filter while a link list was open. This bug has been fixed. **(23795)**

Graphics 3D

✅ Crash when closing the 3D network view after deleting a storyboard: A crash no longer occurs when closing the 3D network view if the storyboard opened in it has been deleted before. **(23757)**

✅ Storyboard animation stopped: In certain situations, the storyboard animation came to a halt or did not continue at all. This bug has been fixed. **(23963)**

I/O Interfaces

✅ 'trainPart' following invalid 'trainPart' is lost during railML import: If the second last 'trainPart' of a 'commercial train' could not be imported (e.g. due to missing assigned OCPs or because categories were filtered out), then the last 'trainPart' was not imported either. This bug has been fixed. In addition, the handling of 'trainParts' that contain only one assigned stop point in the target network has been improved. **(22519)**

✅ Importing "half of" the vehicle data from railML discards vehicle journey sections: If 'formation' elements without 'trainOrder' were indicated in a railML file (i.e. train formations without vehicles), then vehicle journey sections using such a 'formation' could not be inserted into the target network. This error has been fixed. More precisely: The vehicle data can still not be imported, but the vehicle journey sections are inserted into the network without reference to a vehicle combination. **(23777)**

✅ Infinite loop with railML import of line blocks: The additive import of line blocks from railML to existing vehicle journeys in the target network (line block-only import) could enter an infinite loop. This error has been fixed. **(23938)**

✅ Longer calendar in target network during railML import: The railML import now succeeds even if the target network has a calendar that is longer than the period of the railML dataset. In the additive line block-only import, the line block items are allocated to the correct calendar days. For vehicle journeys resulting from a category change from a 'commercial train' running overnight, the share can be imported after midnight if the calendar of the target network contains additional calendar days at the end of the railML reference period. **(23661)**

Installation

- ✅ User installation of Anaconda or miniforge interferes with Visum Python: When Anaconda or miniforge was installed as another Python installation in addition to the Python shipped with Visum, and only for the current user, and this new Python was made the system default, Python modules used by Visum add-ins could subsequently no longer be used. The execution of affected add-ins was then no longer possible. This bug has been fixed. **(23871)**

Junction Editor

- ✅ Editing transit data from RBC controls: An issue related to editing transit input parameters of RBC controls has been fixed. **(23986)**
- ✅ Incorrect geometry for links without intermediate points and lateral offset: Links without intermediate points were displayed with an incorrect geometry if a lateral offset was set at the leg for one of their ends. This bug has been fixed. There are also further improvements to the geometry calculation for various other situations. **(23846)**
- ✅ ANM export failed if there was a common signal controller for several nodes: ANM export failed if there were multiple nodes / main nodes in the network that were allocated to the same signal controller. This error has been fixed. **(24022)**

Line Route Editor

- ✅ Crash when creating time profiles: A crash no longer occurs when creating time profiles in line routes that previously did not contain any time profiles. The crash occurred in the line route editor only when time profiles were created successively in different line routes. **(23843)**

Lists

- ✅ Crash when activating a filter: In certain situations, a crash could occur when activating the link filter while a link list was open. This bug has been fixed. **(23795)**
- ✅ Number of objects in filtered lists: In the tooltip above the upper left cell of a filtered list, the number of currently filtered network objects is now displayed in addition to the total number of network objects. The effect of the global filter is taken into account, as well as any column filters that may be activated in the list itself. **(22374)**

Lists, Other Procedures

- ✅ Freeze after procedure execution: In certain situations, e.g. in the context of open lists with activated analysis rows, Visum could be no longer be used after the execution of procedures (e.g. the calculation of stop area skim matrices). This error has been fixed. **(23710)**

Miscellaneous

- ✅ Update zlib library: The zlib library used to compress files has been updated to version 1.2.12. **(23936)**

Network Editor

- ✅ Accidental editing of surfaces: When selecting a two-dimensional object (e.g. zone, territory, etc.), the editing mode was entered immediately if the editing function for surfaces was switched on, so that it was relatively easy to move a polygon point or a face or to delete a face when moving the mouse. This error has been fixed in that now the object must first be explicitly marked and only then the actual surface editing begins. **(23559)**
- ✅ Crash when rerouting: When editing the course of a line route, a crash could occur in certain cases since the last service pack (ID 23659). This bug has been fixed. **(23858)**
- ✅ Links lost during 'Simplify node-link network for public transport': Links between active and passive nodes could be lost when using the special function 'Simplify node-link network for public transport' if the procedure was only executed for active nodes. This error has been fixed. **(23995)**
- ✅ Marking in line floating dialog incorrect after using arrow keys: The marking displayed in the floating dialog for lines and line routes was shifted by one position compared to the network editor marking after the marking was changed in the dialog using the up or down arrow key. This error has been fixed. **(23780)**

PrT Assignment

- ✅ Non-reproducible results for SBA with daily signal program lists for signal controllers: If there was at least one signal controller in the network where the signal program was determined by a daily signal program list, the simulation-based dynamic assignment (SBA) could lead to non-reproducible behavior. This error has been fixed. **(23989)**

PuT Assignment

- Missing walk link in assignment with DRT and MPA: In timetable-based assignment with a DRT supply, an unjustified error message could occur regarding missing walk links if there were zones with connector shares (MPA) in the network. This error has been fixed. **(23964)**
- Tour plans exported during assignment with DRT could not be imported: Tour plans saved during timetable-based assignment using a DRT transport system could not be re-imported for analysis. This error has been fixed. **(23883)**

PuT Operating Indicators

- Request of storage space for indicators at vehicle journey items only if calculation is enabled: The storage space for indicators at vehicle journey items was used up when calculating PuT operating indicators even if the calculation of these indicators was explicitly disabled in the procedure parameters. This error has been fixed. **(23741)**

Scenario Management

- File transfer error message during distributed computing: During distributed computing of scenarios, there were irregular error messages that files could not be downloaded from the computing node because they were used by another process. This error has been fixed. **(23724)**
- Maximum number of cores for compute nodes too small: In the management of compute nodes for distributed computation in scenario management or for distributed procedure sequences, the actual number of available cores could not be set on computers with many cores (several so-called 'Processor Groups', especially with more than 64 cores), but only a smaller value. This bug has been fixed. **(23499)**
- Working directory not set in scenario management: In scenario management, the working directory was not set to the respective appropriate path until now. For Visum this has little meaning, because for the resolution of relative paths, the project directories are used. However, if a relative path is used in scripts, it is resolved with respect to the working directory. This is now set when loading an uncalculated or a calculated scenario as well as in calculation instances when calculating a scenario. **(23779)**

Schematic line diagram

- Crash when editing classified graphic parameters: After redefining the classes for a classified display of transfer nodes in the schematic line diagram, a crash occurred when subsequently changing data of the individual classes. This error has been fixed. **(23941)**

Visum Files

- Additive import of network files with data for links and conflict handling 'Overwrite attributes': If the conflict handling option 'Overwrite attributes' was selected for links during the additive reading of a network file, only the link of the outward direction was assigned default values from the link type (and then overwritten with the attributes listed in the file) for newly inserted links, but not the link of the reverse direction, which was inserted at the same time. This error has been fixed. **(23864)**
- Crash when reading in global layout files via remote desktop connection: A sporadic crash could occur when opening global layout files in a Visum session conducted via remote access (remote desktop connection). This error has been fixed. **(23840)**
- Impedance parameters of the bicycle assignment not saved: The impedance parameters per demand segment of the bicycle assignment were neither saved in the version file nor in the procedure parameters file. Thus, after saving and reopening, the default values were set. This error has been fixed. **(23981)**
- Unnecessary backup copies: When the regular saving of an automatic backup copy was enabled in the user settings, it was saved more often than necessary after a network change. This bug has been fixed. **(23416)**

2022.01-07 [241119]

⊕ New Features and Changes

Data Model

- ⊕ Changed default for 'Zone association geometric': By default, the attribute 'Zone association geometric' is now set to 'False' when creating a location, as inserting a large number of locations can otherwise lead to performance problems. **(23775)**

I/O Interfaces

- ⊕ New configuration for importing rail infrastructure from OSM: A new configuration 'Detailed Urban Road And Railway Network' is provided for the OpenStreetMap import. This imports the infrastructure for private and public transport as well as POIs, i.e. 'Detailed Urban Network' as before, but without public transport lines or line routes. Line routes can be imported as before with the configuration 'Public Transport Network'. The public transport network can then be imported into the previously imported private and public transport network using the import 'PuT supply from Visum'. **(22909)**

✓ Fixed Bugs

ANM

- ✓ Incorrect geometry for channelized turns with left-hand traffic: During ANM export of a network with left-hand traffic, incorrect geometries were generated for channelized lane turns. This error has been fixed. **(23658)**
- ✓ Invalid ANM files for closed transport systems for outer turns: The ANM export from Visum generated an ANM file that could not be read in Vissim if there was an outer turn that was closed for at least one transport system. This error has been fixed. **(23776)**

Activity Profile

- ✓ Context-sensitive help (F1) missing: In the four profile views (Activity profile, Line block profile, Timetable profile, and DRT vehicle profile), pressing F1 did not open the context-sensitive help. This error has been fixed. **(23745)**

COM-API

- ✓ Additive reading of procedure parameter files faulty: The additive reading of procedure parameter files via one of the two methods IProcedures.Open with the parameter 'appendProcedures = true' or IProcedures.OpenXml with the parameter 'readAdditive = true' did not append the procedure steps contained in the file at the end of an existing procedure sequence but replaced procedure steps at the same position in the procedure. This error has been fixed. **(23703)**

Data Model

- ✓ Visum could not be used when deleting many links with the Links list open: If there were many nodes with invalid node geometries in the network, deleting many links with the Links list open took extremely long, up to the point of being unusable (apparent 'freeze'). This bug has been fixed. **(23645)**

Dialogs

- ✓ Incorrect warning when editing signal controllers: If the signal control data of a fixed time control is edited from the signal controller overview dialog and this dialog is subsequently exited via 'Cancel', an incorrect note was output stating that the changes to the signal control data will not be undone. This error has been fixed. **(23689)**

Filters

- ✓ Crash when filtering PuT paths with passenger trip chains: Crashes no longer occur when evaluating the volume filter if a filter condition is set for PuT paths that causes a path leg in the middle of a PuT path with at least three path legs, which is chained to its subsequent path leg, to become inactive. **(23774)**

I/O Interfaces

- ✓ Infinite loop during railML import of line blocks: An infinite loop could occur in certain cases during the railML import of line blocks. This error has been fixed. **(23683)**
- ✓ List layout files do not take effect in shapefile export: In the shapefile export, list layout files (*.llax) can be specified to define the attribute selection. However, the contents of the file had no effect on the export. This error has been fixed. **(23304)**
- ✓ Message about vehicle journeys not being created and better routing: If vehicle journeys could not be created in the target network because there was no stop point at the start or end time profile item in the target network, this was previously not reported. This error has been fixed. Furthermore, unwanted zigzag routing is avoided in certain cases. **(23786)**

Junction Editor

- ✓ Crash when displaying network with links without geometry: Crashes no longer occur when displaying the Junction editor for a network in which a link has no geometry because From- and To-nodes have the same coordinates and the link also has no intermediate points. **(23678)**

Lists

- Visum could not be used when deleting many links with the Links list open: If there were many nodes with invalid node geometries in the network, deleting many links with the Links list open took extremely long, up to the point of being unusable (apparent 'freeze'). This bug has been fixed. **(23645)**

Main Window

- File selection dialog crash on Windows 11 with OneDrive: A crash no longer occurs when opening the file selection dialog on computers with Windows 11 where the desktop is synchronized with OneDrive (or presumably other cloud services). **(23773)**
- Repairing multiple zigzag routing messages from the network check function: If the network check function was executed to find zigzag routings and multiple messages were issued regarding zigzags on the same line or system route, the subsequent repair of these messages did not lead to the desired result. The reason for this is that repairing a zigzag inevitably changes the indices of subsequent line route items on the same line route (system routes accordingly). Also, marking a message after repairing another message for the same line route no longer marked the area found in the check. This error has been fixed. **(23522)**

Matrix Estimation

- Line boardings instead of PTripsUnlinked: In the procedure 'Demand matrix correction', boardings per line can be used as count data in all variants. In the dialog, however, these are called PTripsUnlinked. This error has been fixed. The difference is that paths that board more than once in vehicle journeys of the same line are also counted several times, which is by definition not the case for PTripsUnlinked. **(23073)**

Network Comparisons

- Crash of TRA viewer when comparing activity executions: A crash no longer occurs when comparing the current network with a version comparison if an activity execution exists in one of the two networks that is not included in the other network. **(23722)**

Network Editor

- Crash when allocating a line if name is empty: A crash no longer occurs when editing the line allocation of a line route if the empty string is entered as the new name of the line route in the allocation dialog. **(23538)**
- Re-routing of line routes changes too many objects: When re-routing line routes, system routes, and PrT paths, items located on the new shortest path found were no longer identified with items located on the existing path. As a result, items between the limiting fixed points that were unchanged were not retained but replaced, so that this new data (lengths, dwell times) was obtained from the network and any vehicle journeys and vehicle journey sections starting or ending there were deleted. This error has been fixed. **(23659)**
- Visual feedback for background texts and polygons: Background texts and background polygons were no longer graphically highlighted when the mouse pointer was located over such an object (and the network editor was in the corresponding mode). Furthermore, a preview was no longer displayed when moving and rotating these objects. Both bugs have been fixed. **(23602)**

Other Procedures

- Emissions for particles PM2.5 incorrect: The emission calculation according to HBEFA could not calculate emissions for particles smaller than 2.5µm (both variants). This error has been fixed. For correct calculation, the updated HBEFA data packages have to be downloaded and installed from our download area. **(23627 ⚠)**

PrT Assignment, Other Procedures

- Green times of stage-based controllers in ICA calculation incorrect: For stage-based signal controllers, the ICA calculation was based on an incorrect green time without taking green times during interstages into account. This error has been fixed. **(23721 ⚠)**

Timetable Editor

- Crash when deleting line block items: No more crash when deleting a line block item in the line block editor. **(23704)**

Visum Files

- Crash when loading a global layout: Crashes no longer occur when loading a global layout if the screen constellation (multiple screens) and screen resolution are different from those under which the global layout file was saved. **(23729)**

- ✅ Crash when reading version files with signalization data: A crash no longer occurs when reading version files with signalization data in which the permissible value ranges, e.g. for green times, are not complied with. **(23744)**

⛔ Breaking Changes

Other Procedures

- ⛔ Emissions for particles PM2.5 incorrect: The emission calculation according to HBEFA could not calculate emissions for particles smaller than 2.5µm (both variants). This error has been fixed. For correct calculation, the updated HBEFA data packages have to be downloaded and installed from our download area. It is no more possible to calculate emissions for particles smaller than 2.5µm using the former data package. **(23627 ✅)**

PrT Assignment, Other Procedures

- ⛔ Green times of stage-based controllers in ICA calculation incorrect: For stage-based signal controllers, the ICA calculation was based on an incorrect green time without taking green times during interstages into account. This error has been fixed. This affects the assignment with ICA as well as the signal time optimization of signal controllers. **(23721 ✅)**

2022.01-06 [240137]	**2022-02-21**

➕ New Features and Changes

Activity Profile

- ➕ Acceleration of the display: The calculation required for the display of an activity profile has been significantly accelerated, so that the time for the initial display after opening and for updating after changes to the data basis is reduced. This particularly affects the activity profile for demand models of the ABM type. In this case, activity executions without a start and end time are no longer displayed in the activity profile. **(23641)**

Data Model

- ➕ Fewer messages for node geometries: If a node has the property 'Use automatic link orientation' and its links have undefined link orientations, then there are no more messages when link orientations are allocated to these links. **(23571)**
- ➕ PuT demand segments with occupation level not equal to 1 not allowed: For PuT demand segments, an occupation level not equal to 1 makes no sense and previously affected various volume attributes in an undefined way. It is now no longer used, and this is also more clearly indicated in the user interface. **(17920)**

Data Model, PrT Assignment

- ➕ Attributes associated with ICA: Several attributes at the node, main node, and leg were allocated to the add-on module 'Vistro' and therefore in many cases not visible and selectable. This error has been fixed. **(23585)**

Demand Procedures

- ➕ New ABM example: A new example showing the use of ABM demand models is now part of the installation. It consists not only of data but also contains ready-to-use Python scripts implementing the calculations that are part of the ABM demand model. **(22755)**

Dialogs

- ➕ Crash when closing the parameter dialog of the transport system-based assignment: Crashes no longer occur when closing the parameter dialog of the transport system-based public transport assignment. **(23654)**
- ➕ Dialog for MaaS Modeller license removed: After discontinuing the ability to calculate the route planning in the web (ID 23320), the related and no longer needed license dialogs have been removed. **(23381)**
- ➕ More information if CodeMeter connection is lost: If the CodeMeter connection is lost, Visum tries to retrieve it and shows a progress dialog during this time, which can be canceled. After canceling, the user gets the possibility to save the current data as a version file, but so far this is not indicated in the dialog. Therefore, a message has been added that indicates this possibility. **(23237)**

Graphics

⊕ User interface for WMS (Web Map Services): Background maps can already be retrieved from any WMS services (Web Map Services), but until now a URL had to be specified. To avoid this, there is now a convenient user interface for configuring these services in the user settings (under 'GUI' > 'Background map'). **(11055)**

I/O Interfaces

⊕ PuT supply from Visum: In addition to stops, stop areas and stop points can now also be identified via an attribute comparison during the import 'PuT supply from Visum'. When successively importing parts of the supply with the option to insert stop points, this avoids the actually same stop areas or stops being created several times in the target network. **(23605)**

Timetable Editor

⊕ Converting empty trips that cross the day limit into vehicle journeys: Until now, an empty trip that crossed the day limit currently set in the line block editor (i.e. usually 0/24h) could not be converted into a vehicle journey. This is now possible. **(21145)**

⊕ Marking line block items across several display levels: Provided that the line blocking time period covers exactly one day, line block items can now be marked across several display levels of a line block by Shift + Click. If the line block is completed and the second click on an item occurs before the already marked line block item, the items after the first clicked item up to the item clicked afterward are considered as intermediate items according to the line blocking logic. **(23268)**

✓ Fixed Bugs

Add-Ins

✓ Add-In 'Demand calibration preparation' could not be nested: The calibration of demand models using the add-in 'Demand calibration preparation' could not be nested for multiple calibration layers. This error has been fixed. **(23202)**

✓ Parts of the dialog of 'Import TransCAD Network' and 'Import Cube Network' disappear: By changing the dialog size it was possible to make the lower part of the parameter dialogs of the add-ins 'Import TransCAD Network' and 'Import Cube Network' disappear, so that especially the buttons to leave the dialog were no longer accessible. This error has been fixed. **(23187)**

Data Model

✓ Output of 'WKTOrtWGS84' at connectors and main turns incorrect: The output of the attribute 'WKTOrtWGS84' was incorrect at connectors and main turns. This error has been corrected. **(23636)**

✓ Unnecessary warnings when deleting an activity location: There is an internal memory structure for a more efficient evaluation of the relation from an activity location to the activity execution carried out at this location. The structure was not correctly adapted for all changes of the data. This could lead to unnecessary error messages, e.g. when deleting an activity location, but also to incorrect evaluations of the relation itself. This error has been fixed. **(23668)**

Demand Procedures

✓ Sorting of schedules aborts: Sorting a schedule in the context of an ABM demand model used to abort if an activity execution in this schedule had neither a From- nor a To-trip. This bug has been fixed. **(23632)**

Dialogs

✓ Alias and UDA actions in attribute selection dialogs can be canceled: If actions for aliases or user-defined attributes are executed in the attribute selection dialog (small or large variant), i.e. primarily aliases or attributes are created or deleted, and the dialog is then exited with 'Cancel', the changes to the aliases or user-defined attributes were previously still applied to the network. This error has been fixed. **(22167)**

Graphics

✓ WMS layer is not updated when changed: A WMS layer displayed in the network editor was not updated when the definition of this layer was changed in the user settings. This bug has been fixed. **(23527)**

I/O Interfaces

✓ Crash when importing a PuT supply from Visum with bundling: A crash no longer occurs when importing 'PuT supply from Visum' if the option 'Bundle route courses in target network' is activated. **(23673)**

✓ Link types with large numbers when importing 'PuT supply from Visum': If a number greater than 99 was specified in the parameters for the import 'PuT supply from Visum' for the link type to be used for inserted links, the parameters could not be saved as a parameter file and loaded again later. This error has been fixed. **(23603)**

⊘ Unnecessary messages during railML import if operating points are not specified in the order in which they are used: If the operating points ('ocpTT') of a 'trainPart' element are not listed in the sequence specified by the 'Sequence' attribute in the railML dataset, needless error messages about shortened/extended trips due to missing stops in the target network could occur during import. This error has been fixed. **(23625)**

Main Window

⊘ Messages during the reading of demand files: Error messages, warnings, and notices that occur during the reading of demand files were previously not displayed in the message window, but were output exclusively in the log file. This error has been fixed. **(23652)**

Network Comparisons, Scenario Management

⊘ Speed up of the generation of model transfer files for demand models: The generation of model transfer files and editing of modifications in scenario management, respectively, has been accelerated for networks with huge demand models of typ EVA-persons or tour-based model. **(23706)**

Network Editor

⊘ Crash when undoing the deletion of a Restricted traffic area: A crash no longer occurs when a Restricted traffic area has been deleted and the operation is subsequently undone. **(23649)**

Other Procedures

⊘ Network-wide warm specific consumption too high: The value for network-wide warm specific consumption shown in the HBEFA statistics list also contained the consumption caused by cold start supplements in all variants (i.e. for gasoline, diesel, and electric vehicles as well as per demand segment or overall), i.e. they were numerically identical to the respective total consumption. This error has been fixed. **(23675)**

⊘ Unnecessary message for the procedure 'P+R lot choice': If no messages occurred during the execution of the procedure 'P+R lot choice', a general warning was nevertheless issued. This error has been fixed. **(23686)**

PrT Assignment

⊘ Crash for restricted traffic areas with a subset of transport systems: There are no more crashes when executing a PrT assignment for multiple transport systems if a restricted traffic area of type 'no through traffic' exists which applies to a subset of the assigned transport systems. **(23672)**

⊘ Incorrect handling of time-varying attributes of turns and main turns in SBA: In the simulation-based assignment (SBA) undefined behavior could occur if a time varying attribute for the TSysSet of turns existed and at the same time other time-varying attributes for main turns were defined. This error has been fixed. **(23646)**

PuT Assignment

⊘ 'Fail to board' creates invalid paths: If 'Fail to board' was taken into account in the timetable-based assignment and boarding was forced at the connected node in the general procedure settings, PuT paths could be created that did not fulfill this condition and were therefore invalid. A subsequent skim calculation could then not be executed either. This error has been fixed. **(23667)**

⊘ Crash in case of fail to board effects with deviating assignment time period: No more crash in case of calculation of failing to board effects in a separate procedure step, if the extended assignment period (i.e. including pre/post) of this procedure step does not include the extended assignment period of the procedure step in which the assignment result was calculated. **(23493)**

⊘ Wrong destination node for 'Fail to board' with MPA: If connector shares are used in the assignment and 'Fail to board' is also taken into account, incorrect destination nodes could occur under certain circumstances for destination zones without proportional distribution. This error has been fixed. **(23650)**

⊘ Dead-locks in connection with PT assignment results: A dead-lock could occur when executing PT assignments or when opening version files containing PT assignment results so that the application did not respond. This bug has been fixed. **(23509)**

Subnetwork Generator

⊘ In the case of a dynamic subnetwork, a matrix is overwritten: When a subnetwork is intersected with a dynamic assignment of matrix time series, the resulting matrix time series in the subnetwork is extended, since parts of the demand typically pass through the cordon zones only after the end of the original time series. This results in an additional matrix. However, this new matrix used to overwrite an existing one. This error has been fixed. **(23642)**

Timetable Editor

- ✅ Manual moving of line block items at the day change: Until now, line block items crossing the day change set in the line block editor (i.e. represented by a block at the end of one display level and at least one more at the beginning of another display level) could not be moved. This error has been fixed. **(21842)**
- ✅ Marking of vehicle journeys and journey items in the graphical timetable: In the graphical timetable, both vehicle journeys and individual vehicle journey items can be marked. If a click near a journey item unintentionally marked an item instead of the journey itself, it was previously no longer possible to replace this marking by clicking on a part of the journey outside the catch radius of the journey items. This bug has been fixed. In addition, the catch radius of the journey items has been reduced so that this situation is less likely to occur. **(23698)**
- ✅ Tooltips in the line block editor prevent marking: In the line block editor, it could happen that the tooltip did not disappear fast enough when the mouse was moved, so that the mouse pointer was on top of the tooltip. In this situation, it was then no longer possible to click on the line block items hidden by the tooltip. This bug has been fixed. **(23267)**

2022.01-05   [238968]

⊕ New Features and Changes

COM-API

- ⊕ Setting default values for turn and main turn: The new SetDefaultsFromGeometryAndTurnStandard and ITurns and IMainTurns function can be used to set default values for turns and main turns. **(11116 ⛔)**

Formulas

- ⊕ Access to n-th word in a string: The new WORDN function can be used to access the n-th word that is created from a string when it is split into words using a specified separator. **(23622)**

Graphics

- ⊕ SVG export for the print area: Just like screenshots, you can now export SVGs based on the print area. **(22054)**

Installation

- ⊕ Product variant 'Thesis' now contains HBEFA: The product variant 'Thesis' has been supplemented by the add-on module HBEFA for emission calculation. **(23569)**
- ⊕ Shared update package for regular and uni installation: Commercial and university installations can now be updated with the same update package in case of a service pack. If both types of installations are located on the same computer, both types of target installations are supplied for update accordingly. **(23379)**
- ⊕ Update CodeMeter Runtime: The CodeMeter Runtime deployed with PTV Visum has been updated to CodeMeter 7.40 **(23521)**
- ⊕ Update VC++-Redistributable: The runtime library of Microsoft C and C++ (VC++-Redistributable) is installed with the latest version 14.30 with Visum. **(23523)**

Junction Editor

- ⊕ Adjustment of lane turn color for marked stages or signal groups: If stages or signal groups are marked in one of the views 'Geometry' or 'Signal timing', the allocated lane turns and crosswalks are no longer drawn in marked display, but in standard (i.e. unmarked) display, because they are not marked themselves. **(23377)**

Lists

- ⊕ Display of table entries for a table definition: From the 'Table definitions' list, the list of associated table entries can now be opened directly via the shortcut menu entry for one or more marked table definitions. **(23513)**

Miscellaneous

- ⊕ Manual: The manual is available in Russian language as of PTV Visum 21. **(23597)**

PrT Assignment

- ⊕ Node impedance calculation according to HCM 7: From now on, node impedance calculation is also possible according to the latest standard HCM 7. **(22919)**

✅ Fixed Bugs

Activity Profile

✅ Copying the classification without the classification attribute: When copying the classification of the graphical parameters for the temporal distribution to the detail view of the activity profile, the classification attribute was not copied until now. This error has been fixed. **(23578)**

COM-API

✅ Crash in I...List.SaveToArray for empty cells: A crash no longer occurs when saving a list with empty cells via COM using SaveToArray. An empty string is written for empty cells. **(23582)**

✅ ISchedules::SortEachSchedule sorts only the first schedule: The ISchedules::SortEachSchedule method for sorting all schedules in the ISchedules container sorted only the first schedule in the container. This bug has been fixed. **(23529)**

COM-API, Network Editor

✅ When replacing vehicle combinations, the filter does not work: When calling the IVehicleJourneySections.ReplaceVehicleCombination method, the 'OnlyActive' parameter did not work. The same applied when calling the multi-edit special function 'Replace vehicle combinations on vehicle journey sections' from the Edit menu. This error has been fixed. The direct call from the shortcut menu in the 'Network' tool window was not affected (but see ID 23558). **(23547)**

Dialogs

✅ Copy & Paste in the 'Aliases' dialog: In the 'Aliases' dialog it was possible to create text in the cells by using the keyboard shortcut Ctrl+V, but the text was not saved when exiting the dialog. This bug has been fixed. **(23316)**

Formulas

✅ Crash when evaluating formulas with matrix aggregation: If matrices have at least one user-defined data attribute, a crash could occur when evaluating formulas defined at other network objects (zones, main zones, stop areas) in parallel and accessing matrices via aggregation functions. This happened, for example, when calculating analysis rows in a list of the other network object (zone, main zone, stop area). This error has been fixed. **(23514)**

Graphics

✅ Wrong scale when exporting a raster graphic with a selected print area: If the print area is exported as a raster graphic, a different scale results than when exporting the entire network view because of the specified output size. The scale specified in the legend did not match until now. This error has been fixed. **(23298)**

Junction Editor

✅ Crash when drawing the Junction Editor after opening a version file: A crash no longer occurs in certain constellations when drawing the Junction Editor immediately after opening a version file. **(23535)**

✅ Vissim node preview refreshes when marking is changed: A Vissim node preview opened from the Junction Editor updated not only when the network was changed, but also when the marking was changed. This bug has been fixed. **(23517)**

Line Route Editor

✅ Crash when opening version files: Crashes no longer occur when opening a version file and restoring the line route editor window if there are lines whose names contain commas. **(23570)**

Miscellaneous

✅ Language setting lost after switching via keyboard shortcut: If the current language for the user interface was switched using the keyboard shortcut Ctrl+L, then the new language setting was not persisted. So if Visum was closed and restarted later, the previously selected language was active again. This bug has been fixed. **(23386)**

Network Comparisons

✅ Crash when reading a model transfer file with line route editor open: Crashes no longer occur when reading a model transfer file while the line route editor is open. **(23403)**

Network Editor

✅ Crash when selecting multiple zones: The program no longer crashes when selecting multiple zones via Ctrl+left click when interactive editing of geometries is enabled in the network editor. **(23525)**

✅ Finding and repairing trivial loops: The check for zigzag routings also finds loops. However, loops were previously marked as trivial if in different time profiles a profile point was located in different traversals of the loop's base point. Furthermore, when removing trivial loops, the program did not correctly take into account whether (given the same location) the profile points were located in the first or the second traversal. Both errors have been fixed. **(23497)**

Other Procedures

✅ 'Convert paths' does not finish: Running the 'Convert paths' procedure with the blocking back model activated resulted in an infinite loop. This bug has been fixed. **(23515)**

PuT Assignment

✅ Changed meaning of headway intervals for hybrid assignment and PuT operating indicators: The headway intervals specified in the procedure parameters of the timetable-based assignment or the procedure 'PuT operating indicators' now always cover the complete calendar. They are used if headway-based supply is also to be taken into account in one of these procedures, in which case those intervals are relevant that intersect the analysis period. If there are intervals before the start of the analysis period, the calculation of the PuT operating indicators with consideration of headway-based supply no longer crashes. In the hybrid assignment, for times outside the assignment period but within the AP (more precisely within the wrapped extended assignment period), the headways defined there are now used differently than before, which changes the results. If no headways have been defined for these times, the procedure can no longer be executed. **(23366 ❗)**

✅ Crash when calculating stop area skim matrices: Crashes no longer occur when executing the procedure 'Calculate stop area skim matrix' if the actual calculation is not possible, e.g. because the time series assigned to the demand segment cannot be used. **(23573)**

PuT Operating Indicators

✅ Changed meaning of headway intervals for hybrid assignment and PuT operating indicators: The headway intervals specified in the procedure parameters of the timetable-based assignment or the procedure 'PuT operating indicators' now always cover the complete calendar. They are used if headway-based supply is also to be taken into account in one of these procedures, in which case those intervals are relevant that intersect the analysis period. If there are intervals before the start of the analysis period, the calculation of the PuT operating indicators with consideration of headway-based supply no longer crashes. In the hybrid assignment, for times outside the assignment period but within the AP (more precisely within the wrapped extended assignment period), the headways defined there are now used differently than before, which changes the results. If no headways have been defined for these times, the procedure can no longer be executed. **(23366 ❗)**

Schematic Line Diagram

✅ Incorrect adjustment to changed stop selection: When creating a stop in the line diagram, the internal directory of which vehicle journeys use an edge was not correctly adjusted if an edge was used multiple times by the same vehicle journey. As a result, markers, for example, could be synchronized incorrectly. This error has been fixed. **(23402)**

Visum Files

✅ Crash when saving with profile analysis in background: A crash no longer occurs when saving a version file if several windows are open including a profile window (activity profile, line block profile, timetable profile, DRT vehicle profile) that is not positioned on top. **(23577)**

❗ **Breaking Changes**

COM-API

❗ Setting default values for turn and main turn: The new SetDefaultsFromGeometryAndTurnStandard and ITurns and IMainTurns function can be used to set default values for turns and main turns. Due to sequence issues, applications that use Early Binding and access temporary attributes of turns or main turns must be bound again. **(11116 ⊕)**

PuT Assignment

⊖ Changed meaning of headway intervals for hybrid assignment and PuT operating indicators: The headway intervals specified in the procedure parameters of the timetable-based assignment or the procedure 'PuT operating indicators' now always cover the complete calendar. They are used if headway-based supply is also to be taken into account in one of these procedures, in which case those intervals are relevant that intersect the analysis period. If there are intervals before the start of the analysis period, the calculation of the PuT operating indicators with consideration of headway-based supply no longer crashes. In the hybrid assignment, for times outside the assignment period but within the AP (more precisely within the wrapped extended assignment period), the headways defined there are now used differently than before, which changes the results. If no headways have been defined for these times, the procedure can no longer be executed. This is always the case if the parameters were generated with earlier program versions and the start of the assignment period does not coincide with the start of the analysis period. **(23366 ⊘)**

PuT Operating Indicators

⊖ Changed meaning of headway intervals for hybrid assignment and PuT operating indicators: The headway intervals specified in the procedure parameters of the timetable-based assignment or the procedure 'PuT operating indicators' now always cover the complete calendar. They are used if headway-based supply is also to be taken into account in one of these procedures, in which case those intervals are relevant that intersect the analysis period. If there are intervals before the start of the analysis period, the calculation of the PuT operating indicators with consideration of headway-based supply no longer crashes. In the hybrid assignment, for times outside the assignment period but within the AP (more precisely within the wrapped extended assignment period), the headways defined there are now used differently than before, which changes the results. If no headways have been defined for these times, the procedure can no longer be executed. This is always the case if the parameters were generated with earlier program versions and the start of the assignment period does not coincide with the start of the analysis period. **(23366 ⊘)**

2022.01-04 [237688]	2021-12-14

⊕ **New Features and Changes**

Activity Profile

⊕ Copying the classification between temporal distribution and detail view: In activity profiles (all variants), the classification can be copied from the detail view to the temporal distribution view or vice versa via the menu button above the classification in the graphic parameter dialog. **(20955)**

Column Chart

⊕ Column charts also for attributes with different units: Previously, only attributes with the same unit could be displayed in column charts. This restriction has been removed. If attributes with different units are combined, the internal values are output on the y-axis, for example, for lengths the values in meters. **(23311)**

Demand Procedures

⊕ Invalid values for destination choice in tour-based model: In the procedure 'Tour-based model - Combined trip distribution/mode choice' invalid values ('NaN') could occur in the result matrices when calculating the destination choice with double binding. This error has been fixed. **(23435)**

⊕ Warning for time series beyond the first day in tour-based model: If path sequences with departure times are output in the procedure Tour-based model - Combined trip distribution/mode choice, only intervals that are on the first day of the calendar are used from the time series used. If a time series is used that extends beyond the first day, a warning is now issued. **(23410)**

Dialogs

⊕ 'Only active lines' option in route course display is retained: The selected state of the 'Show only active lines in the list' option on the route course display page of the network's graphics parameters dialog is now retained during an active Visum session, i.e. the next time the dialog is entered, the previous state continues to take effect. **(23434)**

⊕ Size of input fields for origin zones in PuT assignment: In the procedure parameters dialog of the timetable-based assignment, the input fields for the restriction of the considered origin zones were too small. This error has been fixed. **(23318)**

I/O Interfaces

⊕ Acceleration of GTFS import with exact route courses: The GTFS import has been accelerated in cases where exact route courses are imported. **(23424)**

Lists

⊕ New list 'Network attributes': The new list 'Network attributes' is used to display the values of all attributes of the network itself, i.e. the network settings, but especially the user-defined attributes of the network. Only these can be edited in the list. User-defined attributes of the network (meaning the attribute definitions, not the values) can also be created, edited, and deleted directly in the list. **(19462)**

Main Window

⊕ Explanation of repair functions for 'Network check': Certain 'Network check' functions allow to repair the found problems, as a group or for individual messages in the message window. An explanation text can now be displayed to explain the effect of a repair function. In addition, a non-modal notification is issued after the repair has been performed for an individual message. **(22362)**

⊕ Shortcut 'n' moves network editor to the front: The shortcut 'n' moves the network editor to the foreground. It is available when no text is being entered (e.g. in lists) and no dialog is open. The behavior is the same as for the shortcut 'z' for the zoom function. **(16911)**

PuT Assignment

⊕ PuT skim matrix calculation accelerated: In certain cases, the calculation of skim matrices for public transport has been significantly accelerated. **(21105)**

PuT Operating Indicators

⊕ Acceleration in case of a lot of vehicle combinations: The procedure 'PuT operating indicators' has been accelerated especially in cases where the network contains many vehicle combinations and indicators are calculated for vehicle journey items. **(23414)**

⊕ Acceleration of indicator calculation: The calculation of transport supply, infrastructure costs, and the projection of user-defined attributes has been significantly accelerated, especially in large networks with an analysis period of several days. **(23415)**

Ride Sharing

⊕ Execution of Tour Planning procedure on Web no more available: The execution of the 'Tour Plannning' procedure on the Web is no more available. This applies to the tour optimization method as well as to the dispatcher using the MaaS Modeller on the web. Calculation using the local installation of MaaS modeller remains available. **(23320)**

✅ Fixed Bugs

ANM

✅ Corrections to link polygons and detector positions: In the ANM export, corrections were made to the stop line distances and detector positions. **(23422)**

Activity Profile

✅ Incorrect display in case of closed display with display period longer than AP: If the closed display was selected in the activity profile and the period to be displayed was longer than the analysis period (which acts as a module), activities that ended after the start of the display period plus the duration of the analysis period were displayed incorrectly. This error has been fixed. **(23450)**

COM-API

✅ Multiline header in legend: It was
not possible to set a multiline text as a header in the legend using COM (as before via the dialog). This bug has been fixed. **(23344)**

Dialogs

✅ Global shortcuts ('n' and 'z') prevent script code input: In the procedures dialog of the 'Run script' procedure, the characters 'n' and 'z' could not be entered in the script code. This error has been fixed. **(23405)**

✅ List of transport systems in Vissim route export not stable: In the Vissim route export (coordinates), the list of transport systems in the dialog was not always the same. This bug has been fixed. **(23418)**

Formulas

- ✅ Function StrToNum ignores decimal places: The StrToNum function for converting a string to a number ignored decimal places if the comma was used as separator (digits after a point were taken as decimal places), with no error message. This error has been corrected. More precisely: Still only numbers with the point as decimal separator are accepted, regardless of the selected decimal separator and thousands separator in the user settings. Other characters except digits and point result in an empty value. **(23341 🔴)**

Graphics

- ✅ Line style properties for transfer relations in the network editor no longer adjustable: In the graphic parameters dialog of the network editor, the line style for the line display was no longer displayed on the 'Transfer relations > General settings' page and was also no longer adjustable. This error has been fixed. **(23329)**

Graphics 3D

- ✅ Background map disappears when camera is close to the ground: If the camera was near the ground in the 3D network view, the background map sometimes disappeared, depending on the projection used. Zooming was then also sometimes no longer possible. This bug has been fixed. **(23391)**

I/O Interfaces

- ✅ Coupling of vehicle journeys exceeding midnight during railML import: In railML import, when vehicle journeys were coupled and one of them had a midnight transition before reaching the coupling area, the resulting offset of the valid day was not correctly taken into account. This error has been fixed. **(22818)**

Installation

- ✅ Update of examples: Examples were not updated during the installation of an update package for a service pack even if the initial setup has been executed including the installation of examples. This bug has been fixed. **(23321)**

Junction Editor

- ✅ Crash in signal times view: A crash no longer occurs when switching the signal program of a signalized node or main node in the signal times view of the junction editor in certain constellations. **(23265)**
- ✅ Crash when exclusively editing a node: A crash no longer occurs when selecting a lane while exclusively editing a node. **(23439)**
- ✅ Creating a signal control with data from a *.sig file: If a signal control was created and control data from an external *.sig file was read into it at the same time, the cycle time was not taken from the file but from the (default) value set in the dialog. This error has been fixed. **(23371)**

Lists

- ✅ Value type for some enumeration types not visible in Attributes list: For some attributes, their value type was not displayed correctly in the Attributes list. This occurred for certain enumeration types. This bug has been fixed. **(23349)**

Main Window

- ✅ Adjusting the scale after changing the projection: After changing the used projection, the displayed scale was not updated in the status bar of the main window. This bug has been fixed. **(23387)**

Miscellaneous

- ✅ Backup copies during procedure execution: If the regular saving of a backup copy is set in the user settings and the saving does not succeed because other processes prevent this, this leads to an error message. If this occurs during the execution of a procedure sequence, then in particular the further execution of the sequence is stopped. This applies in particular to the calculation of scenarios in the context of a scenario management project. This error has been fixed in that, as a matter of principle, no attempt is made to create a backup copy during the execution of a procedure sequence, but only afterwards. Moreover, Visum instances started by the calculation server to calculate scenarios never create backup copies. **(23354)**

Network Editor

- ✅ 'Initialize boundaries' for surface objects: If the interactive editing of surfaces is active in the network editor, then after executing the special function 'Initialize boundaries' the base points of the surface remained visible, although the surface was deleted. This error has been fixed. **(17703)**

- ✅ Creating a signal control with data from a *.sig file: If a signal control was created and control data from an external *.sig file was read into it at the same time, the cycle time was not taken from the file but from the (default) value set in the dialog. This error has been fixed. **(23371)**
- ✅ Fixing temporarily changed the line route course: Merely clicking (i.e., without moving) a line route item in the context of an 'Edit course' operation for a line route (or system route, or for a PrT path) apparently changed the path, instead of just fixing the item. This bug has been fixed. **(18148)**
- ✅ Problems when removing zig-zag routings: The special function for removing zigzag routings caused two errors: Firstly, zigzags were classified as trivial, which were not trivial because, in different time profiles of the line route, there are time profile items over different line route items that are at the same node and/or stop point. Secondly, a time profile item at the first turning point of the zigzag was not preserved during the repair, which may have caused vehicle journeys starting or ending there to be deleted. Both errors have been fixed. **(22957)**

Other Procedures

- ✅ Intersection of surface objects scales poorly with the number of compute cores: Intersecting surface objects scaled extremely poorly with the number of compute cores, i.e. the speed did not increase with the number of available compute cores in the expected way. This error has been corrected. **(22365)**

PrT Assignment

- ✅ Crash after renumbering zones while the path list was open: If a PrT path list ('PrT paths' or 'PrT paths on link level') was open and then a zone was renumbered in such a way that the order of the zones changed, a subsequently executed PrT assignment could crash. This error has been fixed. **(23235)**
- ✅ Crash in TRIBUT-Equilibrium_Lohse assignment: No more crash when executing the TRIBUT-Equilibrium_Lohse assignment for multiple demand segments in certain cases. **(23500)**

PuT Assignment

- ✅ Crash after cancellation and volumes at the wrong demand segment: A crash no longer occurs when canceling a timetable-based assignment with iteration (e.g. due to soft capacity constraints for vehicle journeys). Furthermore, in this constellation, it could occur that the volumes of several jointly assigned demand segments were displayed at the wrong demand segment. This error has also been fixed. **(23406)**
- ✅ Crash in case of capacity restriction due to 'Fail to board': A crash no longer occurs in the calculation of timetable-based assignment with capacity restriction due to prevented boarding if there are vehicle journey items that are after the analysis period but in the extended search period (due to the post-assignment period). **(23394)**
- ✅ Crash in headway-based assignment: Crashes no longer occur in certain rare cases when executing headway-based assignments. **(23389)**
- ✅ Prohibited walk links in headway-based assignment with speed-optimized algorithm: If, in headway-based assignment without passenger information ('Optimal Strategies'), the computation-time optimized variant was used, and in the general procedure settings for walk links, the variant 'Force boarding/alighting at connected node' was selected, prohibited walk links were used from the zone to a stop area and from there further to another connected zone. This error has been fixed. **(23280)**

Schematic Line Diagram

- ✅ Crash when marking edge courses in the schematic line diagram: Sporadic crashes no longer occur when marking edge courses in the schematic line diagram when synchronization with the network editor is switched on. **(23400)**

Visum Files

- ✅ Default entry for user-defined PrT skims after saving and reading: If in the definition of the user-defined skim matrix in PrT in the share of links all rows were deleted and then the procedure parameters file or the version file was saved and then read in again, the share for links contained the default row consisting of the attribute AddValue1. This error has been fixed. **(23408)**
- ✅ Specification of a POI at locations optional: The specification of a POI key was obligatory in the network file, i.e. a network file without the corresponding columns could not be read in, although the specification is optional in the Data Model. This error has been fixed. **(23441)**
- ✅ Specification of a POI at locations optional: The specification of a POI key was obligatory in the network file, i.e. a network file without the corresponding columns could not be read in, although the specification is optional in the data model. This error has been fixed. **(23470)**

❗ Breaking Changes

Formulas

⚠ Function StrToNum ignores decimal places: The StrToNum function for converting a string to a number ignored decimal places if the comma was used as separator (digits after a point were taken as decimal places), with no error message. This error has been corrected. More precisely: Still only numbers with the point as decimal separator are accepted, regardless of the selected decimal separator and thousands separator in the user settings. Other characters except digits and point result in an empty value. This changes the results of formulas if they were previously applied to differently formatted strings. **(23341 ✅)**

2022.01-03   [236721]

⊕ New Features and Changes

ANM

⊕ Course of the outer lane is exported: The course of the outer lane is now exported during the ANM export. The ICA turning radius attribute is used for this. **(23336)**

⊕ Link polygons are exported: During ANM export, link polygons are now exported analogously to the display in the geometry view of the Junction editor. **(22920)**

COM-API

⊕ Query of the scale in the network editor via GetScaleOfView: The new method IGraphic::GetScaleOfView can be used to query the current scale of the network editor. **(19565)**

Graphics 3D

⊕ Better display of main nodes in SBA trajectory view: The display of main nodes in the SBA trajectory view of the spatial network view (3D) has been improved. In particular, this makes it easier to see which lane turns are used by vehicles. **(22886)**

Junction Editor

⊕ Exclusive editing of one node: In the new 'Show only selected node' mode, the display and editing can be restricted to the selected (main) node in the Junction Editor. Switching to another (main) node is done by searching for the new (main) node or by synchronization, e.g. with the Network Editor. **(22663)**

Scenario Management

⊕ Aggregation functions in 'Edit project' dialog: In the tables on the various tabs of the 'Edit Project' dialog, an aggregation function can now be selected explicitly for the ungrouped columns when the display is grouped. **(19733)**

Timetable Editor

⊕ Marking vehicle journey line block items: In the line block editor, only line block items are now marked when adjacent vehicle journey items are marked by Shift-clicking, when the block items of an entire vehicle journey or vehicle day are marked, and when block items are marked by drawing a rectangle. If the line block items of all types are to be marked as before, this can still be done using modifiers (Shift or Ctrl in the case of Shift-clicking). **(23266)**

✅ Fixed Bugs

ANM

✅ Crash when exporting ANM routes after a network change: A crash no longer occurs when exporting an ANM route file if such an export has already been performed before and the network has been changed afterwards. **(20503)**

✅ Incorrect specification of 'ReverseLink' leads to unreadable network: In certain cases in connection with line routes, links with an incorrect specification of the 'ReverseLink' were output during ANM export. Such ANM files could then not be read in PTV Vissim. This error has been fixed. **(21278)**

Add-Ins

✅ Display problems in the 'Calculate Matrix' parameter dialog: Display problems in the parameter dialog of the 'Calculate Matrix' add-in when the dialog is resized have been solved. **(22898)**

COM-API

- ⊘ Rejected COM calls after releasing COM list objects: Immediately after destroying COM list objects (I...List), COM calls could be rejected (message "The message filter indicated that the application is busy. (Exception of HRESULT: 0x8001010A (RPC_E_SERVERCALL_RETRYLATER))"). This error has been fixed. However, the destruction of a COM list object remains problematic if Show() was previously called on this list, but neither Close() nor Detach(). **(23289)**

Dialogs

- ⊘ Bar preview in graphic parameter dialogs reacts with delay to changes: The bar preview in various graphic parameter dialogs (e.g. for link bars in the Network editor) did not always react to entries made in the table, but only when the focus was changed to another bar. This bug has been fixed. **(23205)**
- ⊘ Crash in bar display when attributes no longer exist: A crash no longer occurs in the graphic parameters dialog on the Bars > Display page (for any network object type) if a scaling attribute is selected for a bar that does not (no longer) exist in the network (e.g. a deleted user-defined attribute). **(23283)**
- ⊘ Language setting in user settings in local language: The entries for the language setting in the user settings are now displayed in the respective local language. **(12485)**

Graphical Procedures

- ⊘ Termination criterion for PrT isochrones not considered: For PrT isochrones, the maximum isochrone time was not correctly considered. In particular, nodes belonging to a main node but not reachable within the maximum isochrone time did not receive the value for unreachable nodes (100,000h), but an isochrone time greater than the maximum isochrone time. This caused the shortest path search to take longer than necessary. This bug has been fixed. **(23302)**

Graphics

- ⊘ Scaling of flow bundle bars as for reference bars: When a flow bundle bar was automatically created during the calculation of a flow bundle and there was a valid reference bar, the scaling was previously not transferred correctly from it. This error has been fixed. **(23327)**

Graphics 3D

- ⊘ Controls in SBA trajectory view disappear when resized: In the 3-D network view in the variant for SBA trajectories, the controls for playing the recording were sometimes not visible. This bug has been fixed. **(22960)**

I/O Interfaces

- ⊘ SBA trajectories in Publisher only visible when entering a link: When exporting trajectories of SBA vehicles to PTV Visum Publisher, vehicles were only visible from the moment they entered a new link for the first time after the start of the selected time slot. This error has been fixed. **(22735)**
- ⊘ Transfer of attributes with subattributes into PuT updater: Until now, values of attributes with subattributes were not transferred when importing a PuT supply from Visum ('PuT updater'). This error has been fixed. **(20849)**

Installation

- ⊘ Unpacking the projection data: If a user started a new Visum installation for the first time, the projection files were no longer unpacked and provided for this user. This error has been fixed. **(23340)**

Junction Editor

- ⊘ Missing markings in graphics export: When exporting a graphics (both raster and vector) from the Junction Editor, the markings were missing until now. This bug has been fixed. **(23284)**
- ⊘ Node disappears after resetting the lane data: After resetting the lane data for a node or main node, the geometry view of the Junction Editor no longer displayed this node. This error has been fixed. **(23257)**

Main Window

- ⊘ Crash when deactivating a layer in the 'Network' tool window: Crashes no longer occur when deactivating a layer in the 'Network' tool window while a Junction editor is open. **(23372)**
- ⊘ Start page lost recently used files: Loading files that were displayed in the File menu but not on the start page in the list of recently used files (e.g. different layout files) caused too few files to be displayed on the start page. This bug has been fixed. **(22694)**

Miscellaneous

- ✅ Crash without crash dialog: Under certain circumstances, it could happen that a crash of Visum did not lead to the display of the crash dialog by the operating system, with the consequence that the saving of a memory image (crash dump) for the further investigation of the incident in the context of a support message was no longer possible. Also, the automatic recording of a crash dump by the corresponding setting of the operating system did not take place in these cases. This error has been fixed. **(23188)**
- ✅ Problems with file paths that cannot be represented in the local code page: Previously, files whose path contained characters that could not be displayed in the local code page could not be accessed. This bug has been fixed. **(23137)**

PrT Assignment

- ✅ Assignments slower in some cases: The various PrT assignments had become slower in certain cases compared to PTV Visum 22.1-0. This error has been fixed. **(23319)**

PuT Operating Indicators

- ✅ Number of stop events (AH) at the stop point does not take into account projection factors of departing vehicle journey sections: When calculating the number of stops in the analysis horizon as part of the stop point analysis, only the projection factors of the arriving vehicle journey sections were taken into account in the case of couplings, not those of the departing vehicle journey sections. This error has been fixed. **(23244)**
- ✅ Number of stop events and stop times incorrect when changing the analysis time interval: Stops that continue over the change of the analysis time interval (i.e. arrival in interval 1, departure in interval 2) were previously allocated differently in different cases. These are now allocated consistently only to the time interval in which the arrival occurs (even if alighting is prohibited there). In particular, double counting no longer takes place. Affected are the indicators Number of stop events, Number of stop events (uncoupled), Number of section stop events, Stop time and Section stop time at the objects of the line hierarchy, stop points, territory PuT detail, and stop point PuT detail (each if available). Furthermore, passenger trip chains are now correctly taken into account. **(23243)**

2022.01-02 [235917]

2021-10-29

⊕ New Features and Changes

Scenario Management

- ⊕ Column filters for scenarios and modifications: Column filters similar to the ones in lists have been introduced in the various tables of the 'Edit project' floating dialog. This applies in particular to modifications and scenarios. **(18751)**

✅ Fixed Bugs

Data Model

- ✅ Crash in case of link type without VD functions in the network: If there were no link VD functions in the network and you created a link type, Visum could crash in various situations as a result, for example when displaying the list of link types. This bug has been fixed. **(23255)**

Dialogs

- ✅ No project directory in Publisher export: The parameter dialog for the export to PTV Visum Publisher did not use project directories to save its settings. This bug has been fixed. **(23245)**
- ✅ Parameter 'a' at function graph for function type 'Combined': The distribution parameter 'a' is irrelevant for the function type 'Combined'. Nevertheless, it could be edited on the 'Function graph' dialog page of the choice model parameter dialog. This error has been fixed. **(23273)**
- ✅ Selection of transparent colors was applied incorrectly: In graphic parameter dialogs for point objects, under certain circumstances, the selected color was not applied correctly if it was transparent. This bug has been fixed. **(23162)**

Graphics

- ✅ Color of marked network objects: In the network editor, some network objects (including zones) were always drawn in red when marked, regardless of the color set in the graphic parameters for marked objects. This bug has been fixed. **(23178)**

Graphics 3D

- ✅ SBA visualization bug: In some cases, the SBA visualization was only displayed smoothly when the mouse was moved. This bug has been fixed. **(23009)**

I/O Interfaces

- ✅ Problems after railML import of line blocks: The railML import of line blocks (together with vehicle journeys or separately) could result in line blocks whose internal structure was incorrect. As a result, various problems could occur, for example infinite loops when displaying these line blocks or when writing a network file. This error has been fixed. **(23214)**
- ✅ Termination criterion in GPX import for loops: In the GPX import, so far, the termination condition was the length of the path in the network compared to the direct distance between the start and end points of the GPX track. In this criterion, the length of the GPX track is now used for comparison, which allows the import of nearly circular tracks. **(22060)**

Installation

- ✅ Communication with PTV Visum Publisher does not use proxy settings: For communication with PTV Visum Publisher, the Windows proxy server settings were not used until now. Therefore, no communication was possible when using proxy servers. This error has been fixed. **(23159)**

Junction Editor

- ✅ Bing Maps logo always visible: The Bing Maps logo was always visible in the Junction Editor, even when the map was disabled. This bug has been fixed. **(23236)**

Lists, Timetable Editor, Junction Editor, Matrix Editor, Procedure Sequence

- ✅ Input of 'z' in cells not possible: It was previously not possible to directly enter a text with focus on an editable cell (for text) if this text started with the character 'z'. This bug has been fixed. Input after double-clicking in the cell (to explicitly start editing mode) was not affected. **(14863)**

Network Editor

- ✅ The location search worked only with certain projections. This bug has been fixed. **(23242)**
- ✅ Update of relation from zones to locations at Undo and Redo. If a zone polygon is modified in such a way that the set of allocated locations changes, the relation to these allocated locations was not adjusted after 'Undo' or 'Redo'. This bug has been fixed. **(23247)**

Other Procedures

- ✅ Network check 'Link orientation': The network check function 'Link orientation' used to take into account the already existing orientations. This error has been fixed, i.e. link orientations are now always calculated as if the (main) node was newly created, and differences to this solution are output as possible corrections. **(23150)**

PrT Assignment

- ✅ Impedance incorrect at nodes with unknown control type for ICA: If ICA is set as the method for node impedances, then the impedance at nodes with an unknown control type (which is the value of the turn VD function in this case) was evaluated incorrectly in the assignment variants 'Equilibrium assignment Bi-conjugate Frank-Wolfe', 'Equilibrium assignment', 'Equilibrium assignment LUCE' and 'Incremental assignment'. This error has been fixed. **(23234 ⚠)**
- ✅ Reading of version file failed during ICA assignment with MPA: If an assignment was calculated with ICA using connector shares per OD pair (MPA) and the result was saved as a version file, such version files could not be read in again. This error has been fixed. Version files written in this state can still be opened at the loss of the possibility to set up a later ICA assignment based on the existing assignment. **(23227)**
- ✅ Turns never counted as converged in dynamic stochastic assignment: In the dynamic stochastic assignment, turns never counted as converged. If the 'Ignore turns' option was not selected, the inner iteration only terminated when the maximum number of inner iterations was reached. This bug has been fixed. **(23254)**

Visum Files

- ✅ References to files on non-existent network drives: Crashes no longer occur when reading in version files with attributes of type File that contain references to files on a network drive that is not available. **(23251)**
- ✅ Zone allocation of locations from old demand files: When importing locations from demand files that were written with PTV Visum 2021 or earlier and therefore did not contain a distinction between geometric or user-defined zone allocation, the zone allocation was set to 'geometric'. This error has been fixed. **(23250)**

⚠ Breaking Changes

PrT Assignment

⚠ Impedance incorrect at nodes with unknown control type for ICA: If ICA is set as the method for node impedances, then the impedance at nodes with an unknown control type (which is the value of the turn VD function in this case) was evaluated incorrectly in the assignment variants 'Equilibrium assignment Bi-conjugate Frank-Wolfe', 'Equilibrium assignment', 'Equilibrium assignment LUCE' and 'Incremental assignment'. This error has been fixed. The results of the mentioned procedure variants change accordingly. **(23234 ✅)**

2022.01-01 [235364]   2021-10-19

⊕ New Features and Changes

ANM

⊕ SBA penalty for merging vehicles in ANM: The value of the node attribute 'SBA penalty for merging vehicles' introduced with ID 22231 is now transferred to Vissim via ANM. **(22323)**

COM-API

⊕ Access to hybrid assignment parameters: COM access to the parameters for headway-based supply in the context of timetable-based assignment has been added. **(23158)**

⊕ Logging of rejected calls: When a COM call to Visum is rejected, the cause is now output to the log file to make troubleshooting easier. **(23195)**

I/O Interfaces

⊕ Acceleration of the PuT Updater: A moderate acceleration was achieved in the PuT Updater (Import 'PuT supply from Visum'). **(23172)**

Installation

⊕ Update CodeMeter Runtime: The CodeMeter Runtime deployed with PTV Visum has been updated to CodeMeter 7.30a. **(23231)**

PuT Assignment

⊕ Coordination in hybrid assignment: When using headway-based supply in a timetable-based assignment, it is now also possible to consider coordination groups between headway-interpreted time profiles. **(23132)**

Visum Files

⊕ Error message when reading corrupt Visum files: For all version files written with PTV Visum 2021 or newer, errors in the file that occurred after the version file was written (e.g. during storage or transfer) are reliably detected. The error message issued in this case has now been significantly improved. In particular, the section of the version file affected by the data error is also mentioned. **(23039)**

✅ Fixed Bugs

COM-API

✅ Unspecific error message when using SaveVersion with an invalid path: Attempting to save a version file using SaveVersion in an invalid path previously resulted in the unspecific error message 'A serious error (Code e06d7363) has occurred in the script'. This message has been improved. **(23200)**

Data Model

✅ Incorrect format of WKT strings: In certain cases, WKT strings for line-shaped geometries were output in an incorrect format. This affected both the attributes of all network objects and the export to PTV Visum Publisher. This error has been fixed. **(22822)**

Dialogs

✅ Design hourly volume for impedances at the node is displayed rounded: In the 'General procedure settings' dialog, on the dialog page for impedances at nodes, the factor by which the attribute selected for calculating the design hourly volume is multiplied was displayed with two decimal places. As a result, entering and then exiting the dialog implicitly rounded this coefficient to two decimal places. This error has been fixed. **(21488)**

- ✅ Editability in various graphic parameters dialogs: In various graphic parameters dialogs (e.g. for links bars in the network editor), not all attributes were grayed out in the table if they did not work with the current settings. This bug has been fixed. **(22817)**
- ✅ Note on specific projections for background maps: In the graphic parameters dialog, a note is displayed on the 'Background map' page for map providers that deliver the map as tiles, stating that changing the projection can speed up background map retrieval. However, detecting this feature did not work for some tile services, including PTV map services. This bug has been fixed. **(22910)**
- ✅ Quick access in attribute selection dialog did not update when aliases were changed: The 'Quick access' section in the attribute selection dialog did not update when an alias was created, edited, or deleted from the dialog. This bug has been fixed. **(21761)**

Graphical Procedures

- ✅ Controls in the 'Graphics tools (Flow bundle)' tool window too small: In the 'Graphics tools' tool window, the layout of the controls on the 'Flow bundle' page was often inconvenient. This has been fixed. **(23006)**

Graphics

- ✅ Marking remained when deleting nodes: After deleting nodes, the marking of the nodes remained visible. This error has been fixed. **(23126)**
- ✅ Problems with special WMS service from Taiwan: Several specific problems that occurred when using the WMS service at https://wms.nlsc.gov.tw/ as a background map have been solved. **(22458)**

I/O Interfaces

- ✅ Connection to Personal Geodatabase not possible: The connection to the Personal Geodatabase was not possible because the ESRI license check always failed. This error has been fixed. **(23174)**
- ✅ Creating user-defined attributes in railML import parameter dialog resets entries: Entries made in the 'RailML import' dialog on the 'Attributes for timetable data' tab in the upper area for flagging imported vehicle journeys were reset when the 'Create user-defined attributes' button was pressed. This error has been fixed. **(20781)**
- ✅ Incorrect format of WKT strings: In certain cases, WKT strings for line-shaped geometries were output in an incorrect format. This affected both the attributes of all network objects and the export to PTV Visum Publisher. This error has been fixed. **(22822)**
- ✅ Infinite loop during railML import: An infinite loop no longer occurs during simultaneous import of vehicle journeys and line blocks from railML in certain cases. **(23163)**
- ✅ Unspecific error message in case of failed connection to personal geodatabase: If no installation of the used ESRI software is found or no license to use it is available, no connection to the Personal Geodatabase can be established. The error message indicating one of these two reasons has been improved. **(22839)**

Junction Editor

- ✅ Incorrect calculation of tCur for uncontrolled nodes: For nodes with control type 'uncontrolled', the travel time in the loaded network tCur of the turns was calculated differently in the node impedance calculation according to ICA and in assignments, especially with regard to the application of the maximum value and the maximum multiple of t0. The calculation is now uniformly performed as follows: The maximum value is applied to the node tCur, i.e. to the value of the node VD function, still without the turn's entered travel time supplement t0, which is added afterward. The reference value for the maximum t0 multiple is the node t0 with a possible soft blocking via the node VD function. **(23191 🛑)**

Lists

- ✅ Column filter for identifier attributes: Especially in the data model for the PuT supply, there are some identifier attributes (e.g. 'Operator identifier' at vehicle journeys) that are primarily intended for a readable display in the timetable editor. For these attributes, the column filter did not work in lists. This error has been fixed. **(21037)**
- ✅ Crash during assignment with selection in path list: No more crash when executing a PuT assignment if a PuT path leg list is open and individual path legs are marked in this list. **(23153)**
- ✅ List with active column filter empty after recovery from version file: If a version file in the window configuration contained a list in which a column filter was set to an attribute that was a multiple enumeration type (e.g. 'VSysSet'), this list was initially empty after the recovery because all rows were filtered out. This error has been fixed. **(21256)**

Main Window

- ✅ Crash when 'Check network' tool window is open: A crash no longer occurs when changing the network (e.g. loading a version file) with the 'Check network' tool window open. **(23102)**

Matrix Editor

- ✅ Calculation operations affected all matrices: If a matrix editor displayed several matrices and the tool window 'Matrices' was visible at the same time, a calculation operation (e.g. Set value) triggered in the shortcut menu of a matrix affected all matrices displayed in the matrix editor. This bug has been fixed. **(22988)**

Miscellaneous

- ✅ Cancel when license is lost reacts very slowly: If 'Cancel' was pressed in the dialog indicating the loss of the connection to the license in use, it took too long for the program to respond in a way visible to the user. This bug has been fixed. **(22965)**
- ✅ Logging of the activity protocol failed: If no network was loaded yet and the activity protocol was activated in the user settings, the creation of an activity protocol failed. This also applied to subsequent program starts. This error has been fixed. **(23175)**
- ✅ Visum terminates after loss of license: If several instances of PTV Visum were started and the connection to the license server was lost, one of these instances was sometimes terminated without further interaction as soon as the connection to the license server was restored. This error has been fixed. **(23189)**

Network Editor

- ✅ Z-coordinates when creating links: When creating links, the Z-coordinates of the intermediate points of the link were not interpolated from the Z-coordinates of the two limiting nodes, but were all set to 0. This bug has been fixed. **(23146)**

PrT Assignment

- ✅ Incorrect calculation of tCur for uncontrolled nodes: For nodes with control type 'uncontrolled', the travel time in the loaded network tCur of the turns was calculated differently in the node impedance calculation according to ICA and in assignments, especially with regard to the application of the maximum value and the maximum multiple of t0. The calculation is now uniformly performed as follows: The maximum value is applied to the node tCur, i.e. to the value of the node VD function, still without the turn's entered travel time supplement t0, which is added afterward. The reference value for the maximum t0 multiple is the node t0 with a possible soft blocking via the node VD function. **(23191 ⛔)**
- ✅ Incorrect consideration of through traffic bans: In certain constellations, the consideration of "No through traffic" was incorrect, namely when the shortest path left and re-entered the restricted traffic area for a relation starting and ending in the restricted traffic area, but the path inside the traffic area was more favorable for other relations. In affected cases, crashes could occur but also passing assignment procedures with incorrect results. This error has been fixed. **(23196 ⛔)**
- ✅ Merge weights did not always work in SBA: In the simulation-based dynamic assignment (SBA), merge weights did not always work correctly. This affected in particular one-lane ramps to multi-lane highways with left-hand traffic. This error has been fixed. **(23179)**
- ✅ Wrong node impedances in dynamic stochastic assignment: In the dynamic stochastic assignment, node VD functions were incorrectly evaluated based on the turn volumes instead of based on the node volumes. This error has been fixed. **(23193)**

Procedure Sequence

- ✅ Marking in procedure sequence extremely slow: Marking rows (=procedures) in the procedure sequence was unreasonably slow. This was especially noticeable when (accidentally) selecting all rows of a longer procedure sequence by clicking in the upper left cell. This error has been fixed. **(22932)**

PuT Assignment

- ✅ Crash during assignment with selection in path list: No more crash when executing a PuT assignment if a PuT path leg list is open and individual path legs are marked in this list. **(23153)**
- ✅ Crash in the transfers list after delay analysis: Crashes no longer occur in the display of the transfers list if a timetable-based assignment with calculation of the risk of delays was executed and transfers were saved 'between time profiles' in accordance with the general procedure settings. **(23144)**
- ✅ Headway-based assignment after deleting a line: If a headway-based assignment was executed directly after deleting a line, the results could differ from those calculated after opening the version again. This bug has been fixed. **(23203)**
- ✅ Incorrect rounding if volumes are saved at another demand segment: If at least two demand segments were assigned together and the volume of at least one demand segment was saved at another demand segment, and rounding of demand and volume was activated at the same time, rounding was incorrect. This error has been fixed. **(23181)**
- ✅ Start fares did not take effect in speed-optimized headway-based assignment: When using fares in the headway-based assignment with the passenger information level 'Optimal Strategies', the start fare of the fare systems did not take effect when using the speed-optimized algorithm. This error has been fixed. **(23201)**

PuT Operating Indicators

- ✅ Calculation of transport performance based on direct assignment: It was previously not possible to calculate indicators of transport performance based on a direct assignment. This error has been fixed. In this case, implausible paths are now not taken into account, and the calculation of transport performance per territory and time interval is now also possible. **(23107)**

Visum Files

- ✅ Crash when importing a version file with line block editor open: Sporadic crashes no longer occur when importing a version file with window recovery when a line block editor is opened at this time. **(23130)**

❗ Breaking Changes

PrT Assignment

- ❗ Incorrect calculation of tCur for uncontrolled nodes: For nodes with control type 'uncontrolled', the travel time in the loaded network tCur of the turns was calculated differently in the node impedance calculation according to ICA and in assignments, especially with regard to the application of the maximum value and the maximum multiple of t0. The calculation is now uniformly performed as follows: The maximum value is applied to the node tCur, i.e. to the value of the node VD function, still without the turn's entered travel time supplement t0, which is added afterward. The reference value for the maximum t0 multiple is the node t0 with a possible soft blocking via the node VD function. This changes assignment results in networks affected by the maximum values as well as results of the node impedance calculation according to ICA. **(23191 ✅)**
- ❗ Incorrect consideration of through traffic bans: In certain constellations, the consideration of "No through traffic" was incorrect, namely when the shortest path left and re-entered the restricted traffic area for a relation starting and ending in the restricted traffic area, but the path inside the traffic area was more favorable for other relations. In affected cases, crashes could occur but also passing assignment procedures with incorrect results. This error has been fixed. **(23196 ✅)**

Junction Editor

- ❗ Incorrect calculation of tCur for uncontrolled nodes: For nodes with control type 'uncontrolled', the travel time in the loaded network tCur of the turns was calculated differently in the node impedance calculation according to ICA and in assignments, especially with regard to the application of the maximum value and the maximum multiple of t0. The calculation is now uniformly performed as follows: The maximum value is applied to the node tCur, i.e. to the value of the node VD function, still without the turn's entered travel time supplement t0, which is added afterward. The reference value for the maximum t0 multiple is the node t0 with a possible soft blocking via the node VD function. This changes assignment results in networks affected by the maximum values as well as results of the node impedance calculation according to ICA. **(23191 ✅)**

2022.01-00 [234416]   2021-09-27

⊕ New Features and Changes

Activity Profile

- ⊕ Detail view: The filtering of the elements in the detail view can now be canceled or can only be based on the selected time. **(21199)**

COM-API

- ⊕ Output of notes in case of rejected COM calls: If the Visum COM server is busy, it can generally happen that incoming COM calls are rejected (exception 'RPC_E_SERVERCALL_RETRYLATER' (0x8001010A)). In this case, a note on possible causes is now output to the log file to facilitate the search for possible causes. **(23085)**
- ⊕ Remove zigzags: Until now, zigzags in line routes could only be removed interactively. Now, with a new COM function, this possibility is also available via the COM API. **(22625)**

Data Model

- ⊕ New relations between point objects and surface objects: There are new multi-relations between nodes or POIs (point objects) and surface objects (territories, main nodes, POI surfaces, restricted traffic areas). This allows to identify the containing surface objects or contained nodes or POI point objects respectively. **(19406)**

- Relation from link to allocated count locations: Access to the count locations allocated to a link has been accelerated. **(17236)**
- Time series and time interval sets: Standard time series can be defined on the basis of time interval sets. Conversely, time interval sets with the corresponding time intervals can be generated from standard time series. **(19924)**

Demand Procedures

- List for activity chains: There is a new list for activity chains. **(19465)**

Dialogs

- Line breaks in column headers: In lists and embedded grids, column headings are automatically wrapped. The height of the heading line can be set separately for this purpose. **(11199)**
- PuT Operating Indicators: After the functional enhancements by the stop point analysis, the procedure parameter dialog of the PT operational indicators was restructured and made clearer. **(22984)**
- Time series and time interval sets: Standard time series can be defined on the basis of time interval sets. Conversely, time interval sets with the corresponding time intervals can be generated from standard time series. **(19924)**
- Tour planning: After the functional enhancements of the route planning, the procedure parameter dialog was restructured and made clearer. **(22119)**

I/O Interfaces

- Error messages when accessing PTV Visum Publisher: The error messages issued when accessing PTV Visum Publisher have been made more specific and are now also written to the log file to make them more transparent. **(23129)**

Installation

- Power saving mode: The PTV Visum application now survives power saving mode, which is common especially on laptops, i.e. if the system is put into power saving mode while the Visum instance is running, the same instance can continue to be used after the system is restored. **(22940)**

Junction Editor

- Attribute ID 'CIslandoffset': The attribute ID of the leg attribute 'CIslandoffset' has been changed to 'Lateraloffset'. **(23013)**
- Change of default values: The default values of the following attributes have been changed: Length (Detector), Has separate right turn (Leg), and channelized turn (Leg). **(22668)**
- Check of SCs: A check for transport consistency is provided for signal controls of the Vissig type. It finds transport conditions that do not make sense. In the Vissig window, these are highlighted in red. **(22461)**
- Creating detectors: When creating detectors, the attribute 'TSys' is preset with the lane attribute of the same name. **(22924)**
- Crosswalks: The geometry calculation for crosswalks has been adjusted so that crosswalks are correctly placed and displayed even in non-standard cases. **(22173)**
- Display of lane turns: The geometry calculation for lane turns has been modified. **(22175)**
- Display of the center island: The display of the center island has been improved. It is no longer displayed as paved. **(22551)**
- Network section: The network section of the Junction editor is saved with the global layout. **(22936)**
- Usability: Various improvements have been made to improve usability and support existing workflows while editing. **(22667)**
- Vissim previewer updated: The Vissim version used for the node preview has been updated to PTV Vissim 2022.00-00. **(22746)**

Lists

- Line breaks in column headers: In lists and embedded grids, column headings are automatically wrapped. The height of the heading line can be set separately for this purpose. **(11199)**
- List for activity chains: There is a new list for activity chains. **(19465)**

Main Window

- Login to PTV Cloud: The user's login to PTV Cloud is shown in the program. **(21188)**

Miscellaneous

- Creating zones: The process of creating zones for large matrices has been accelerated. **(23074)**
- Version comparison with command line parameters: Simple version comparison ('Compare current network with version file') is possible using command line parameters. For the comparison, Visum must be started with the parameters -h [VerFile1] -j [VerFile2]. **(22985)**

Network Editor

- Check network for inaccessible stop points: The network check function 'Boarding and alighting at inaccessible stop points' now displays a special message in advance in case there are no connectors in the network instead of listing all stop events. **(23024)**
- Multiple selection of network objects: By dragging a rectangle, a multi-selection of the selected network object type is made. The objects can be edited, but they are not filtered as in the spatial selection. **(21933)**
- Network check for link orientations: A new network check function has been added. It checks whether the current orientations match those that would be set during a recalculation. A corresponding repair function is also provided. **(21965)**

Other Procedures

- ABM tours: The procedure "Generate path sequences from tours" generates path sequences from ABM tours. Path sequences, in contrast to tours, can be displayed and analysed as paths of existing assignments. **(20249)**
- Pseudo-dynamic volumes (PDV): There is a new procedure, the pseudo-dynamic volumes (PDV), which is used to generate dynamic volumes for links based on the paths of a static assignment and a demand time series. **(17218)**
- SC split optimization: The option 'Retain intergreens' in the general procedure settings has been removed, i.e. the intergreen matrix for signal groups is always taken into account. If this is empty, the value of the SC attribute 'Standard intergreen' applies. **(22904)**

PrT Assignment

- BPR type VD function: The special handling for integer exponents in the BPR function has been removed. **(21477 ⛔)**
- Classical equilibrium assignment: The procedure has been modernized and significantly accelerated. **(17641 ⛔)**
- Equilibrium_Lohse procedure: If a PrT assignment of the 'Equilibrium_Lohse procedure' variant exists when opening a version file in the procedure sequence, a warning is issued because this procedure has been discontinued, i.e. it will no longer be available from the release version in 2023. **(22892)**
- Pseudo-dynamic volumes (PDV): There is a new procedure, the pseudo-dynamic volumes (PDV), which is used to generate dynamic volumes for links based on the paths of a static assignment and a demand time series. **(17218)**

PuT Assignment

- Discomfort Skim Matrix: In the general procedure settings, the time unit can be set for the PT skim matrices. However, this did not work for the skim matrix discomfort due to overload, it was always calculated in seconds. This has now been changed, the discomfort skim matrix is now always calculated according to the general procedure settings. **(21962)**
- Headway-based Assignment: The simultaneous headway-based assignment of many demand segments has been accelerated. **(22693)**
- Hybrid PuT assignment (timetable-based and headway-based): In the timetable-based assignment, it is now possible to consider a part of the supply, for which either no timetable is known or for which the specific timetable is not relevant from the customer's point of view due to the very dense supply, as a headway-based supply. No vehicle journeys need to be defined on this part. PuT path legs on a headway-based supply have no reference to specific vehicle journeys. **(18487)**
- Service frequency: The calculation of the service frequency considers coupled vehicle journeys. As a result, two coupled vehicle journeys are only counted as one trip opportunity in the service frequency. **(22370)**

PuT Line Blocking

- It's possible to manually insert empty trips in a line block. **(22969)**

PuT Operating Indicators

- Number of Section service trips: For the evaluation of double traction, the key figure number of section service trips can be evaluated differentiated by vehicle combination and territory. For this purpose, two new indicators have been introduced: 'Number of section service trips' at the Territory- PuT detail and 'Number of section service trips-vehicle combination' at the vehicle journey item. **(21769)**

- Revenue for vehicle journey items: In addition to vehicle journeys, revenues are also reported for vehicle journey items. **(20807)**
- Stop point analysis: The new stop point analysis summarizes the operational and traffic performance indicators from the perspective of the stop point and offers new indicators. A list of the indicators can be found in the manual. The 'Number of service trips' indicators are renamed 'Number of stops events' for stops and stop points. The indicator of the stop events at territories, Territory PuT detail and Territory PuT detail-vehicle journey item are prefixed with 'Number', so that the naming is consistent. **(21718)**
- Transport supply: Indicators for the transport supply can now be calculated if only headway information is available for the service. Indicators on the aggregation below the time profile are not possible. **(13934)**
- Vehicle Journey Items: The number of stop events are calculated at the vehicle journey items. Additionally they are derived on the basis of vehicle journey section, and without considering couplings. **(19578)**

Visum Files

- Warning when overwriting version file in newer format: When overwriting an existing version file, a warning is now issued if a file in a format of an earlier program version is replaced by the current version in the process, so that the file can then no longer be opened in the older program version. The prerequisite is that you activate the general warning regarding the overwriting of existing files in the user settings. **(19363)**

✓ Fixed Bugs

Add-Ins

- Error when using weighted aggregation in 'Calculate Matrix': Using the weighted aggregation (function 'AVGW') in the 'Calculate Matrix' add-in resulted in an error message. This error has been fixed. **(23082)**

COM-API

- Effect of AddAllColumns at lists dependent on user setting: The effect of the 'AddAllColumns' method on list objects (I...List) was previously dependent on the user's settings for preselecting time intervals for attributes with subattributes AHP or AHPI or AZI. This error has been fixed in that this method now always creates columns for all subattribute values, analogous to the method of the same name at 'ITableAttrSelection'. **(22991)**
- Exporting transposed lists to array: No more crash when exporting a transposed list (e.g. list 'PuT assignment statistics' or list 'Emission statistics (HBEFA)') via the SaveToArray method. Transposed lists are also saved to the array in non-transposed form, i.e. the first dimension corresponds to the objects, the second to the attributes per object. **(22868)**

Data Model

- Attributes of structural properties inaccessible for Tour-based model: The attributes of the network object structural property were only accessible with the add-on module EVA, although they are also required in demand models of type Tour-based model. This error has been fixed. **(23055)**
- Restriction of the duration of the calendar period: For very long calendar periods, the number range is not sufficient to display points in time distinctively, with a wide variety of negative effects on the data model and procedures. The duration of the calendar period is therefore now limited to a maximum of 50 years. **(22961)**
- Shortest path search criterion for empty trips at the block version: The shortest path search criterion when creating empty trips was previously saved as an attribute ID at the block version, although it was actually an enumeration type. Therefore, the previous attribute 'Link attribute for shortest path' at the block version has been made obsolete and replaced by the new attribute 'Criterion for shortest path searches used for empty trips' of appropriate (enumeration) type. **(23004)**

Demand Procedures

- Sorting of activity locations: Activity locations are sorted in lists, among others, according to the associated activity codes. However, the sorting differed from the sorting in activity lists with regard to upper and lower case. This has been changed: The sorting with regard to activities is now identical in both lists. **(22959)**

Dialogs

- Crash after changes to signal programs: A crash no longer occurs when selecting a signal program in the SC dialog after signal programs of the signal control assigned to this SC have been removed. **(23066)**
- Crash in parameters dialog of 'Spatial PuT analysis': No more crash when deleting an attribute entry in the parameters dialog of the procedure 'Spatial PuT analysis' if it is the only attribute entry of this procedure. **(22926)**
- Crash on empty file name for matrix operand from file: A crash no longer occurs when exiting the 'Select the operand for ... ' dialog if loading a matrix from file is selected but no file name is indicated. **(22712)**

Filters

- ✅ Filter on empty multi-enumeration type (e.g. TSysSet) did not always work correctly: If the condition was set in the filter that an attribute of an enumeration type that allows multiple selections (typically sets of objects such as TSysSet, DSegSet, etc.) was not equal to the empty set or contained at least one element of the empty set, network objects whose attribute value was the empty selection fulfilled this filter condition. This bug has been fixed. **(22917)**

Formulas

- ✅ Crash when accessing demand segments whose volumes are stored at other demand segments: If it was indicated in the general procedure settings for a PuT demand segment that the volumes would be stored at another demand segment, Visum crashed until now, if either a demand matrix correction was executed for this demand segment or the assignment matrix was accessed via a formula. This error has been fixed. **(23104)**
- ✅ Error in MIRROR_LOWER function inside formula matrices: The MIRROR_LOWER function available in formula matrices returned incorrect results under certain conditions. This bug has been fixed. **(23070)**

Graphics 3D

- ✅ Warnings during SBA visualization: If trajectories of an SBA assignment were displayed in the 3D network editor, but were not recorded during the SBA assignment, warnings that occurred during the assignment possibly interrupted the recording of the trajectories. This error has been fixed. **(22864)**

I/O Interfaces

- ✅ Crash when exceeding size limit for Access export: A crash no longer occurs when exporting large amounts of data to MS Access when the size limit of 2GB is exceeded. An error message now indicates the limit. Since Access limits the file size itself, the actual problem can only be solved by using other databases, e.g. SQLite. **(22649)**
- ✅ Trajectory export to PTV Visum Publisher: When exporting trajectories to PTV Visum Publisher, incorrect data could occur. This error has been fixed. **(22911)**
- ✅ Warning for unlisted OCPs during railML import: If OperationControlPoints (OCPs) were used in trainPart elements while importing railML that are not listed in the infrastructure, this violation of the referential integrity of the railML file was previously accepted silently. Now such files can still be read in, but a warning lists all affected OCPs. **(23058)**
- ✅ Windows for login and Visum Publisher export sometimes in the background: On certain systems, it could happen that the window for login as well as the window for export to PTV Visum Publisher was not displayed as part of Visum but as a separate window in the Windows taskbar and could also be hidden by the main window of Visum. This error has been fixed. **(22998)**

Junction Editor

- ✅ Display of the Signal times view: The Signal times view was not displayed correctly in some cases. This error has been fixed. **(23049)**
- ✅ Display of the stop line: For nodes of the control type 'Two-way yield', the stop lines were drawn incorrectly on all lanes of links and not only on lanes of links that have to give way. This error has been fixed. **(23035)**
- ✅ Right-turns in opposite flow in ICA calculation: When calculating the node impedance according to ICA, for the opposite flow of a permitted left turn with the option 'ICA right turn will influence opposing left turn' switched on, the right turns of the opposite direction were only taken into account for this opposite direction in the case of shared straight/right lanes. This error has been fixed. **(23056)**

Lists

- ✅ Analysis rows in path lists when switching the demand segment: After switching the displayed demand segments of a path list, the analysis rows (Min, Max, Sum or Avg) continued to display values matching the previously displayed content of the list. This error has been fixed. **(23030)**
- ✅ Case-sensitive key attribute changes: For network object types whose key is a string (e.g. transport system or line), this key attribute could not be changed in a list if this change consisted only of case-sensitive key changes. This bug has been fixed. **(22221)**
- ✅ Marking when releasing the mouse outside the cells: If the mouse is released outside the display area of the cells when marking a whole block in a list or in the matrix editor, the marking displayed as a preview was not applied. This bug has been fixed. **(22775)**

Matrix Editor

- ✅ Marking when releasing the mouse outside the cells: If the mouse is released outside the display area of the cells when marking a whole block in a list or in the matrix editor, the marking displayed as a preview was not applied. This bug has been fixed. **(22775)**

Matrix Estimation

- Consideration of PT walk trips: The matrix correction procedure adjusts demand matrices in such a way that the resulting volumes correspond as closely as possible to count values. Previously, PT walk trips were also taken into account in the volumes, although they were presumably never counted in the count values. The procedure has now been changed: PT walk trips are no longer taken into account in the volumes. **(22879)**
- Crash when accessing demand segments whose volumes are stored at other demand segments: If it was indicated in the general procedure settings for a PuT demand segment that the volumes would be stored at another demand segment, Visum crashed until now, if either a demand matrix correction was executed for this demand segment or the assignment matrix was accessed via a formula. This error has been fixed. **(23104)**

Network Comparisons

- No display of differences between POIs and user-defined tables: When comparing the current network to a version file, the values of both networks are displayed. However, this did not work for the values of user-defined attributes at POI categories or user-defined tables. This bug has been fixed. **(23119)**

Network Editor

- Crash when removing trivial zigzag routings: Crashes no longer occur when repairing trivial zigzag routings if the coupling would have to be removed for a vehicle journey of the affected line route and the corresponding query was answered with 'No'. **(22925)**
- Network section incorrect when marking ABM objects without a location reference: When marking an ABM object without a location reference, e.g. a newly inserted trip, the network editor showed the area around the coordinate (0, 0) when the synchronization mode 'Move' or 'Autozoom' was switched on. This error has been fixed. **(23020)**

Other Procedures

- Message during 'Set travel times': When executing the special function 'Set travel times' for user-defined PrT paths, an error message occurred and the action could not be undone. This error has been fixed. **(23023)**
- Multimodal assignment conceals error messages: If error messages occurred during the execution of the procedure 'Multimodal assignment', the procedure was still considered to have been executed successfully, and as a result, subsequent procedure steps in the procedure sequence were executed. This error has been fixed. **(22982)**
- Negative buffer size possible in 'Intersect' dialog: In the parameter dialog of the 'Intersect' procedure, negative values could be entered for the buffer size of the source or target object, which were then treated as 0 during the actual calculation. This error has been fixed. **(23025)**

Passenger Surveys

- Change between vehicle journeys on the same time profile always implausible: If in multi-line survey data specific vehicle journeys were indicated by their number and a change from one vehicle journey to another vehicle journey on the same time profile was required within a path, this path was always marked as implausible. This error has been fixed. **(23038)**

PrT Assignment

- Calculation of vCur-PrTSys: The calculation of v0-PrTSys and vCur-PrTSys was not consistent, so that certain VD functions returned vCur values that were smaller than v0PrT. This error has been fixed. **(23005)**
- Incorrect network volumes in intermediate steps: In the Bi-conjugate Frank-Wolfe, Incremental assignment, and Equilibrium_Lohse methods, network volumes were not calculated correctly in the intermediate steps, which deteriorated the convergence. This error has been fixed. **(22906)**
- Rare crash in various assignments: A possible, but very rare cause for crashes in various PrT assignment procedures has been fixed. **(22913)**
- Right-turns in opposite flow in ICA calculation: When calculating the node impedance according to ICA, for the opposite flow of a permitted left turn with the option 'ICA right turn will influence opposing left turn' switched on, the right turns of the opposite direction were only taken into account for this opposite direction in the case of shared straight/right lanes. This error has been fixed. **(23056)**
- Warm start for PrT assignment with ICA: The calculation of the PrT assignment with ICA with warm start took unnecessarily long because the values were not saved in the version file. This error has been fixed. **(22511)**
- Warnings during SBA visualization: If trajectories of an SBA assignment were displayed in the 3D network editor, but were not recorded during the SBA assignment, warnings that occurred during the assignment possibly interrupted the recording of the trajectories. This error has been fixed. **(22864)**

PuT Assignment

- ✅ Connection file import and network changes: The program no longer crashes when carrying out a timetable-based assignment using percentage shares (MPA) and based on a connection file if, between writing this connection file and using it as the basis for the assignment, the network has been changed so that previously connected zones are no longer connected. In this case, the use of the connection file is now rejected. **(23064)**
- ✅ Wrong search impedance at transition from DRT to lines: When using Branch&Bound search in timetable-based assignment with DRT, the impedance was incorrectly calculated when transferring from a DRT path leg to a path leg covered with a PuT line transport system. This error has been fixed. **(23141)**

PuT Operating Indicators

- ✅ Crash on user cancelation: A crash no longer occurs when the user explicitly cancels the procedure 'PuT operating indicators'. **(22963)**
- ✅ Slight errors in line blocks lead to error messages in PuT operating indicators: If the calculation of costs and vehicle requirements in the PuT operating indicators was based on line blocks that contained slight errors (e.g. vehicle errors or layover time errors), this led to the output of an error message in the message window. In this situation, however, the calculation can still be performed, and the PuT operating indicators procedure is then considered to have been completed successfully. This error has been corrected by downgrading the message to a warning. **(22980)**
- ✅ Two errors occured when calculating indicators for the network object 'Territory PuT detail vehicle journey item': Firstly, the indicators 'Number of service trips' (with and without coupling) were not distributed to the individual vehicle combinations for evaluation levels with vehicle combination. Secondly, values could be output for territories in which the relevant vehicle journey item was not located, if the section for the subsequent vehicle journey item was located in this territory. Both errors have been fixed. **(22819)**

Ride Sharing

- ✅ Tours with stop event exceeding day change: The execution of the procedure 'Tour planning' or the import from PTV MaaS Modeller failed if a vehicle tour contained a stop event that started before the day change and ended afterwards. This error has been fixed. **(23065)**

Subnetwork Generator

- ✅ Attribute values at vehicles per block item type were lost: When generating a subnetwork, values of attributes at vehicle units and at vehicle combinations that had subattribute block item type (e.g. cost rate, range, etc.) were lost. This error has been fixed. **(23012)**

Visum Files

- ✅ Faulty files result from '&' in codes: In certain cases procedure parameter files and version files could be created that were not readable if the character '&' occurred in strings (e.g. in DSeg code 'P&R'). This error has been fixed. **(23019)**
- ✅ Non-deterministic behavior of the network reader when completing line routes: In certain special cases, non-deterministic behavior could occur when reading in line routes or system routes to complete the route course if inserted elements were located on link stop points and no path could be found during the shortest path search for completing the line course. This bug has been fixed. **(23069)**
- ✅ Switched off Vissig SCs are switched on: If a signal control (SC) of the type Vissig was switched off via the attribute but had a valid signal program, it was implicitly switched on when writing and later reading the version file. This error has been fixed. **(22983)**

⛔ Breaking Changes

Filters

- ⛔ Filter on empty multi-enumeration type (e.g. TSysSet) did not always work correctly: If the condition was set in the filter that an attribute of an enumeration type that allows multiple selections (typically sets of objects such as TSysSet, DSegSet, etc.) was not equal to the empty set or contained at least one element of the empty set, network objects whose attribute value was the empty selection fulfilled this filter condition. This bug has been fixed. Thus, procedures that are restricted to 'Active network objects only' deliver different results than before. **(22917)**

Junction Editor

- ⛔ Right-turns in opposite flow in ICA calculation: When calculating the node impedance according to ICA, for the opposite flow of a permitted left turn with the option 'ICA right turn will influence opposing left turn' switched on, the right turns of the opposite direction were only taken into account for this opposite direction in the case of shared straight/right lanes. This error has been fixed. As a result, the results of the assignment with ICA change. **(23056)**

Matrix Estimation

- ⊘ Consideration of PT walk trips: The matrix correction procedure adjusts demand matrices in such a way that the resulting volumes correspond as closely as possible to count values. Previously, PT walk trips were also taken into account in the volumes, although they were presumably never counted in the count values. The procedure has now been changed: PT walk trips are no longer taken into account in the volumes. This may change the results. **(22879)**

PrT Assignment

- ⊘ BPR type VD function: The special handling for integer exponents in the BPR function has been removed. This can change the results of the BPR function slightly. **(21477 ⊕)**
- ⊘ Calculation of vCur-PrTSys: The calculation of v0-PrTSys and vCur-PrTSys was not consistent, so that certain VD functions returned vCur values that were smaller than v0PrT. This error has been fixed. As a result, calculation results may change. **(23005)**
- ⊘ Classical equilibrium assignment: The procedure has been modernized and significantly accelerated. This changes the results of the procedure. **(17641 ⊕)**
- ⊘ Incorrect network volumes in intermediate steps: In the Bi-conjugate Frank-Wolfe, Incremental assignment, and Equilibrium_Lohse methods, network volumes were not calculated correctly in the intermediate steps, which deteriorated the convergence. This error has been fixed. This changes the results of the mentioned assignment methods. **(22906)**
- ⊘ Warm start for PrT assignment with ICA: The calculation using the option 'Use current assignment result as initial solution' for PrT assignment with ICA took unnecessarily long because the values required for the warm start were not saved in the version file. This error has been fixed. As a result, the results of the assignment with ICA change when using the 'Use current assignment result as initial solution' option. **(22511)**

Visum Files

- ⊘ Switched off Vissig SCs are switched on: If a signal control (SC) of the type Vissig was switched off via the attribute but had a valid signal program, it was implicitly switched on when writing and later reading the version file. This error has been fixed. As a result, after writing and reading the version file, the attribute value changes compared to the previous state and subsequently also the results of various procedures (e.g. ICA calculation, Assignment with ICA). **(22983)**

PrT Assignment

- ⊘ Right-turns in opposite flow in ICA calculation: When calculating the node impedance according to ICA, for the opposite flow of a permitted left turn with the option 'ICA right turn will influence opposing left turn' switched on, the right turns of the opposite direction were only taken into account for this opposite direction in the case of shared straight/right lanes. This error has been fixed. As a result, the results of the assignment with ICA change. **(23056)**

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⊕ New Features and Changes

ANM

- ⊕ Signal data: During the ANM export the content of the SC attribute 'Signal program data' are written into the ANM file to transfer data of signal controllers. **(22523 ⊘)**

Add-Ins

- ⊕ Adaptaton of add-ins to Python 3.9 environment: All add-ins delivered with PTV Visum have been updated to Python 3.9. **(22723)**
- ⊕ The wx-Python library has been updated to version 4.1.1. Add-Ins that are part of the Visum installation have been adapted. **(22157)**

COM-API

- ⊕ Access to currently loaded scenario: There is a new COM method at IProject that returns the currently loaded scenario as an IScenario object. **(16926)**

- Changed return value of 'GetFilteredSet' and 'FilteredBy': The methods 'GetFilteredSet' and 'FilteredBy', available on network object container objects like 'ILinks', no more return an unspecific object of type 'ICollectionBase', but the specific network object container object of the same type as the method has been called on. Therefore, specific methods available for this type can be called directly. E.g. for an 'ILinks' object you may directly call 'SplitAtStopPointOnLink' on the result of the 'GetFilteredSet' or'FilteredBy' operator. **(20420)**
- Check if an attribute exists: The new method AttrExists on the IAttributes object allows to query whether there is already an attribute with the specified attribute ID in the network. **(19430)**
- End literals in the COM documentation: For enumeration types, the last literal of the enumeration type, which is not a permissible expression, was sometimes listed in the COM documentation. This error has been fixed. **(18739)**
- Extensions for COM access of markings: COM access is now possible for markings of type StopSequenceItem, Storyboard, StoryboardAction, CameraPosition. **(16318)**
- Fast access through new methods 'GetMultipleAttributesRaw' / 'SetMultipleAttributesRaw': Analogous to the accelerated access methods for matrices there are new accelerated access methods 'GetMultipleAttributesRaw' / 'SetMultipleAttributesRaw' designed for reading / writing attribute values. In the helper library VisumPy.helpers shipped together with Visum there is also a pair of methods with the same names. These check the integrity of the passed parameters and should be used when using these new accelerated access methods. **(18512)**
- Import and Export of .sig files: At ISignalControl there are new COM methods for the import and export of .sig files. **(22214)**
- ItemByKey method for access to a single attribute: The new ItemByKey method at the IAttributes object now allows direct access to a single attribute. Parameter is the attribute ID, returned is the corresponding IAttribute object. **(15504)**
- More functions for adding and removing columns in lists: The COM objects for lists (I...List) now provide more functions to add or remove columns, similar to the ITableAttrSelection object. In particular, all columns of a category (e.g. 'PrT Input') can be added using 'AddColumnsForCategory'. **(20942)**
- Multiple PrT shortest path searches via COM: A new COM function allows the calculation of many PrT shortest path searches with one function call. **(22158)**
- Option in list of persons: The option 'Location as household' or 'Location as long-term choice' available in the list of persons is now also accessible through the COM method SetObjects of IPersonList. **(22006)**
- Paste from clipboard via COM: The new method PasteFromClipboard() at Visum.Lists. has been introduced which allows to paste content from the clipboard via COM in lists. **(22030)**
- Support for Python 2 ends: Python 2 is not supported anymore. Corresponding parts of the installation of PTV Visum have been removed. Scripts must be adapted to Python 3. **(22074)**

Data Model

- Bicycle traffic: When a new network is created, it automatically includes a transport system, a mode, and a demand segment with the name Bike. **(22683)**
- Converting POIs to locations: POIs can be converted into locations. The POIs are either subsequently deleted or for the location a reference to the originating POI is created to subsequently transfer further attributes from the POI to the location. **(20606)**
- Copy and paste of definitions of user-defined attributes (UDA): The definitions of user-defind attributes (UDA) can be copied from one version file to an other via the clipboard. Corresponding functionality can be found in the context menu of the list of attributes. **(21740)**
- Cost of line blocks / -elements: The total costs of line blocks and line block elements are shown. An additional attribute at the respective object shows the weighted costs according to the set cost function. **(20643)**
- Cost rate per vehicle: The cost rate per vehicle always refers to the analysis period. In existing models, that use the analysis horizon as a reference period, the cost rate is divided by the projection factor of the valid day 'daily' and the reference period is set to analysis period. **(21985)**
- Default for storage of PrT paths: The default for saving PrT paths in the general procedure parameters has been changed to 'Save as connections'. **(12808)**
- Display of attributes with percentages: Attributes that typically represent proportions (e.g. vol/cap ratio) are displayed in the format 'Percent' by default, whereby the floating point number is multiplied with 100. **(21217 ⊙)**
- Evaluation of elevation data of links: There are four new calculated attributes of links that evaluate elevation data from the link polygon including its intermediate points. **(22117)**
- Generation of objects of the node geometry: For nodes and main nodes with a default geometry the objects of the node geometry (legs, lanes, lane turns) are always generated when reading version files. Consequently, the corresponding lists always show all objects and evaluations based on attributes of these objects are available immediately. **(21795)**
- Integration of daily plans with the calendar: Daily signal plans can now also be allocated to calendar days. The attribute 'Daily signal program list number' has been abolished, instead the daily signal plans allocated to calendar days can be viewed via the SC attribute 'Daily signal program list number per day (CDay)'. In the procedure 'Set signal times', the active signal program is now set for the respective calendar day. **(22297 ⊙)**
- New relation to effective signal groups: There is a new relation from stages to effective signal groups. The effective signal groups are the signal groups that are actually green during a stage. **(22496)**

- New relations between stop points and territories: There are new relations between stop points and territories showing containing territories and contained stop points, respectively. **(22258)**
- New relations of POIs: There are two new relations from POIs, namely to the nearest node and to the nearest active node. **(22003)**
- New relations of locations: There are two new relations from locations, namely to the nearest node and to the nearest active node. **(22342)**
- Path items: The vehicle tour items, which result from dispatching a ride sharing service, now contain information about charging time and dwell time at holding areas. **(22454)**
- Regulated traffic areas: The network object 'Toll systems' has been renamed to 'Regulated Traffic Areas' and the functionality has been extended. In addition to the area toll, regulated traffic areas of type 'No through traffic' and 'No traffic' can now be defined and taken into account in static assignments as well as in the simulation-based assignment (SBA). Regulated traffic areas are taken into account in the impedance function. A restriction to active areas is possible for the calculation of the impedance. In particular, the renaming of the network object affects the COM interface, since corresponding COM objects and methods have been renamed as well. **(16841 ⚠)**
- Relation from node to allocated location: Nodes have a relation to all locations for which they are the nearest (or nearest active) node. **(22665)**
- Unification of the data model for signal control: With the exception of RBC control, signal controller are defined in Visum based on the Vissig data model. Previously defined internal signal controllers are converted to Vissig when read in Visum 2022. The signal data is stored into an attribute 'Signal program data' of the SC. The same applies when reading models with Vissig control, i.e. signal data is also read into this attribute and no longer stored in external .sig files. Some of the Vissig control data, especially attributes of signal groups and stages, are reflected in Visum and can be edited in the junction editor or in lists. More complex signal controllers are to be edited via the Vissig GUI. **(22209)**
- Unique geometric or user-defined allocation of locations to zones: Locations now have an allocated zone, which can optionally be defined geographically. An attribute can be used to specify whether or not this is to be understood as a manually allocated zone or the zone in which the location is found. The relation from the location to the zone outputs the relevant zone. Conversely, a new relation at the zone outputs all locations allocated to this zone. **(22655)**
- Unlimited number of demand segments: The number of demand segments within a network is no more limited (was max. 512 up to now). **(22584)**
- Volume capacity ratio attributes: The naming of the volume capacity ratio attributes has been standardized. The average ratio in the line hierarchy is now consistently referred to as 'MeanVolSeatCapRatio' or 'MeanVolTotalCapRatio'. The ratio at the line route- and travel time- profiles were named 'VolSeatCapRatio' and 'VolTotalCapRatio', respectively. At the links, the utilization of public transport is now called 'VolSeatCapRatioPuT' and 'VolTotalSeatCapRatio'. **(22130 ⚠)**

Data Model, Graphics

- Adjusting graphic parameters: The adjustment of graphic parameters has been accelerated, so that in particular operations based on the data model of public transport (such as the aggregation of line routes) have shorter run times. **(21910)**

Demand Procedures

- Distribution functions Logit and Combined:
  The distribution functions Logit and Combined were previously formulated with a parameter 'a'. In the subsequent calculations, this parameter appeared in both the numerator and the denominator, which is why it could not have any effect on the results and was therefore superfluous.
  This parameter has now been removed and can no longer be entered by the user. However, the results may still change slightly due to minimal numerical inaccuracies. **(21385)**
- Message for trip distribution with Kirchhoff: The error message when calculating a trip distribution with negative Kirchhoff exponent and non-positive utility values has been improved. **(21585)**
- Trip generation with negative savings in the freight demand calculation: If the values of savings become negative, then the transformed savings are set to zero regardless of the function type used. This means that tours from A to B via C back to A are not used, if they are more expensive than the sum of tours A-B-A and A-C-A . **(21870 ⚠)**

Dialogs

- Encoding for text files: The options for encoding of text files in the user settings have been removed. The default UTF8 is now always used. **(22296 ⚠)**
- Extensions for the SC dialog: The dialog for signal control has been extended to import and export .sig files. **(22212)**
- Language and add-ons: The language settings can be found under the user preferences in the 'GUI / General' branch. The 'GUI / add-ons' branch shows additional modules. You can activate and deactivate these to limit the number of functionalities on the user interface. The license dialogue only shows the information about your license. **(20796)**

- ⊕ PuT operating indicators: In the procedure parameter dialog for PuT operating indicators, the grid in the Tab 'User-defined attr.' has been replaced by a modern list grid. **(22885)**
- ⊕ Saving matrices: When saving matrices in binary format there is an additional option for saving column and row names. **(21804)**
- ⊕ Transform network coordinates: For a coordinate transformation, the user can choose between the center of the network and a free coordinate as the center. The center point of the transformation is the coordinate that will not change during scaling and rotation. **(22066)**

Filters

- ⊕ Automatic activation of filters when editing: Filters are activated automatically when the filter is edited. **(21775)**
- ⊕ Line and stop filter: The filter dialogs of the lines and the stops cover all associated hierarchy levels. Line routes, travel time profiles etc. as well as stop areas and stops are accessible in tabs. The selection of the displayed tab when opening the filters is now more intelligent. In general, the dialog opens with the tab that was open for the last time during the session. Access from special views or on specific hierarchy levels are considered and the selection of the initial register is adjusted. **(21580)**
- ⊕ Use of active network objects for 1:1 relations: When filtering network objects that have a 1:1 relation to other network objects (e.g. connector to zone), the active network objects can be referred to by selecting the aggregation function 'CountActive' objects as an attribute and setting the value to 1 (true) or 0 (false). **(21000)**

Formulas

- ⊕ Allocation of time series elements to matrices: When converting percentage time series to matrix time series the time series elements are references by matrix references using the code and time information of corresponding matrices. **(21094)**
- ⊕ Line breaks in formulas: Line breaks in strings within formulas are allowed arbitrarily. **(22631)**

Graphics

- ⊕ Column charts: Column charts are available for vehicle journeys, time profiles, and as a network-wide evaluation. **(21526)**
- ⊕ Drawing of markings: Drawing of markings is done in the background without blocking the program. When selecting many objects the synchronization can be switched on via the context menu entry 'Synchronize marking'. **(19121)**
- ⊕ Improvements for the SVG export: The SVG export parameters include an additional option for the transformation of coordinates. The new option corresponds to the default and adjusts the range of coordinates. **(22790)**
- ⊕ SVG Export for the geometry view: For the geometry view of the junction editor there is now the possibility of the SVG export. **(22473)**
- ⊕ Speed up of drawing of markings: Drawing of markings has been accelerated significantly. **(14294)**
- ⊕ Visualising path sequences: When visualizing path sequences, paths from an existing assignment can optionally be used. Up to now, all existing paths were displayed. The improved functionality now only draws exactly one, randomly selected assignment path. **(19268)**

I/O Interfaces

- ⊕ Consistent allocation of the code during VDV452 import: During the VDV452 import, stop areas now receive the same code as stop points assigned to them. **(21509)**
- ⊕ DBF Import: Data from DBF files can be imported to PTV Visum. After specifying a name, a user-defined table is created with the contents of the DBF file. This function can also be called via COM. **(22517)**
- ⊕ Data base format: The default data base format for both the export as well as the import has been changed to SQLite. **(22251)**
- ⊕ Emme- Import: The interface for importing data from Emme (4 or smaller) has been updated. Additional 'extra attributes' are imported. Polypoints of links and m-lines for changes to the Link TSys have been considered. The dialogues have been modernized. **(22029)**
- ⊕ Import MapFan DB: Increment P company provides detailed map data for Japan. Visum imports Map Fan DB data directly into an empty network. Both the roads and the railroads data are transferred. **(22065)**
- ⊕ RailML Import: If the RailML files contain additional information for timetables, blocks, vehicles, or vehicle combinations that previously had no equivalent in Visum, these can now be assigned to attributes or created as user-defined attributes. **(19485)**
- ⊕ railML-Import: Line blocks without the underlying journeys in railML files can be transferred to PTV Visum. The prerequisite is, that the required journeys already exist in the model. The block information is mapped to the existing journeys during import. **(22053)**
- ⊕ railML-Import: Not only operation, control or stop points can be used to describe the route, but also link information. The attributes holding this information are now selectable not only on the destination but also on the origin side. **(21802)**

⊕ railML-Import: Vehicle information will be read from railML data 'vehicles' and 'formations' and is assigned to vehicle units and vehicle combinations within PTV Visum. **(21673)**

Installation

⊕ Support for Python 2 ends: Python 2 is not supported anymore. Corresponding parts of the installation of PTV Visum have been removed. Scripts must be adapted to Python 3. **(22074)**

⊕ The wx-Python library has been updated to version 4.1.1. Add-Ins that are part of the Visum installation have been adapted. **(22157)**

⊕ Update of Python 3.X: The Python 3 environment has been updated to version Python 3.9.5 (Release Date: May 3, 2021). At the same time, the supplied libraries have been updated to the latest version. **(21572)**

Junction Editor

⊕ Background map: In the geometry view of the junction editor, a background map can optionally be displayed. **(22319)**

⊕ Editing link geometry: The geometry of links can be edited interactively in the geometry view of the junction editor. **(22469)**

⊕ Graphic parameters: For the geometry view there are graphic parameters that are saved in the version file and in the global layout. **(22320)**

⊕ Junction editor layout: The global layout has been extended. It also includes the view of the junction editor. Via the menu Junction editor > Open junction editor layout it is possible to read global layouts partially, i.e. with the information saved for the junction editor only. **(22884)**

⊕ New relation to effective signal groups: There is a new relation from stages to effective signal groups. The effective signal groups are the signal groups that are actually green during a stage. **(22496)**

⊕ Selection of signal program: The combo box for selecting the signal program is also available for stages in the Junction editor under geometry. **(22507)**

⊕ Signal timings - View: The signal timings view in the junction editor now always shows the geometry view in the upper part and the signal groups in the lower part. For stage-based SC, the interstages are also displayed. interstages can be freely moved within the cycle time. The duration of the interstages can also be changed via the context menu. **(22462)**

Lists

⊕ Column filter: The selection of the filter category in column headers has been extended by the entries 'Empty' and 'Not empty'. This allows distinguishing between the entries '0' and 'Empty' for attributes that allow empty values. **(20654)**

⊕ Copy and paste of definitions of user-defined attributes (UDA): The definitions of user-defind attributes (UDA) can be copied from one version file to an other via the clipboard. Corresponding functionality can be found in the context menu of the list of attributes. **(21740)**

⊕ Paste from clipboard via COM: The new method PasteFromClipboard() at Visum.Lists. has been introduced which allows to paste content from the clipboard via COM in lists. **(22030)**

⊕ SC list: The list of SC has been improved. SC can be created and deleted via the list. The context menu has been extended and enables access to the SC dialog, to the Vissig GUI or the allocation of nodes and main nodes to the SC. **(22445)**

Lists, COM-API

⊕ The previously implicitly connected lists for PrT paths from assignments (i.e. with demand segments) on the one hand and user-defined paths (i.e. allocated to path sets) on the other hand have been separated at the user interface as well as in the COM interface. Therefore, in the 'Lists' menu under 'Paths' there are now separate entries to the lists 'PrT Paths' and 'PrT paths on link level' for the assignment paths and to the lists 'Path sets', 'Paths' and 'Path items' for the user-defined paths. Similarly, at the ILists object in COM via CreatePathList or CreatePathItemList the list for user-defined paths or their elements is opened. Switching the IPrTPathList by specifying a path set in the SetObjects method is no longer possible. **(18702 ⊖)**

Matrix Editor

⊕ Editing filtered entries: filtered entries in the matrix editor are hidden by default. If a rectangle is drawn interactively over active and passive entries and a value is assigned to the entries, the changes are only applied to the active elements. **(18136)**

⊕ Editing headers of views: The headers of the matrix editor, matrix histogram and matrix comparison can be changed under the menu of the corresponding view > Change header.... **(21277)**

⊕ Matrix histogram, Matrix comparison: Both the matrix histogram and the matrix comparison optionally take into account the filters on zones, OD pairs, or matrix values. **(2651)**

⊕ Matrix histogram: For long-running calculations in the matrix histogram, a progress bar and a remaining time are displayed. It is possible to cancel this calculation. **(21791)**

- ⊕ Matrix histogram: The user guidance in the 'Matrix histogram' view has been improved. **(17634)**
- ⊕ Rounding in the matrix editor: The method used for random round has been changed to bucket round. **(19408)**

Network Editor

- ⊕ Aggregation of zones or territories: If zones or territories are aggregated by an attribute, the value of this attribute is taken over. **(22279)**
- ⊕ Allocation of time series elements to matrices: When converting percentage time series to matrix time series the time series elements are references by matrix references using the code and time information of corresponding matrices. **(21094)**
- ⊕ Calculation of z-coordinate when splitting a link: When splitting a link, the z-coordinate is calculated for the new node. This also considers the z-coordinates of the link polygon points. **(22661)**
- ⊕ Drawing of markings: Drawing of markings is done in the background without blocking the program. When selecting many objects the synchronization can be switched on via the context menu entry 'Synchronize marking'. **(19121)**
- ⊕ Location search: A location search allows you to navigate quickly in large networks. In the network editor, you will find a button that allows you to enter short search terms. Potential hits will be displayed. The location of the selected address is displayed in the network editor. **(15590)**
- ⊕ MapTiler background maps: Maps provided by the provider MapTiler are now available as background map. **(22754)**
- ⊕ Network Check: A new check finds stops that have no PuT-Walk connection to zones but at which time profiles allow boarding and alighting. The optional repair function prohibits boarding and alighting at such stops. **(21587)**
- ⊕ Remove zigzags: The check for zigzag routing of line and system routes has been changed. Trivial zigzags are now also zigzags that have profile points only on one of the links that have been traversed multiple times. These are taken over during the repair. **(20950)**
- ⊕ Remove zigzags: The check of zigzag routings of line and system routes has been extended to loops. A loop is created when the same route point is passed over several times. Within the loop, the same route points are traversed for the outward and return directions. Trivial loops have no further profile points within the loop. After checking for zigzags and loops, these are reported and optionally repaired. **(20982)**
- ⊕ Speed up of drawing of markings: Drawing of markings has been accelerated significantly. **(14294)**

Network Editor, COM-API

- ⊕ Split links: A function to split links at link stop points is available via the context menus of links and link stop points. The function can be called via COM on basis of a container of links and stop points as well as on single links and stop points. **(19321)**

Other Procedures

- ⊕ Integration of daily plans with the calendar: Daily signal plans can now also be allocated to calendar days. The attribute 'Daily signal program list number' has been abolished, instead the daily signal plans allocated to calendar days can be viewed via the SC attribute 'Daily signal program list number per day (CDay)'. In the procedure 'Set signal times', the active signal program is now set for the respective calendar day. **(22297 🛇)**
- ⊕ Signal optimization: Green time optimization for Vissig controllers with signal group-based programs is now also available. **(22385)**
- ⊕ Shortest path search: The shortest path search that is used outside the private transport assignment has been improved and accelerated. **(21818)**

PrT Assignment

- ⊕ Bicycle assignment: A new PrT assignment method for bicycle traffic was added, taking into account special aspects of cyclists' behavior. **(22052)**
- ⊕ Improvements for the method bi-conjugate Frank-Wolfe (BFW): The assignment method bi-conjugate Frank-Wolfe has been improved: Firstly, memory consumption has been reduced and secondly, the assignment fulfills the condition of proportionality across transport systems. **(20009 🛇)**
- ⊕ Look ahead distance for lane choice in SBA: For lane choice, a look-ahead distance can be taken into account beyond the end of the link that the vehicle enters. For this purpose, a new link attribute 'SBA look-ahead distance for lane choice' has been introduced, which defines the distance starting from the ToNode of the link. **(17847)**
- ⊕ Messages for calculations of PrT skim matrices: The output of messages when executing the PrT skim matrix calculations has been improved. **(21929)**
- ⊕ Messages when initializing PrT assignments: The output of messages when initializing PrT assignments has been improved. **(20968)**
- ⊕ Precise message on warm start of SBA with percentage connectors (MPA): If percentage connectors with distribution for individual relations (MPA) are used, the simulation-based dynamic assignment (SBA) cannot be based on an existing assignment result. However, when trying to do so, a non-specific error message appeared so far, which did not point out this cause. This message has been improved. **(19907)**

- Regulated traffic areas: The network object 'Toll systems' has been renamed to 'Regulated Traffic Areas' and the functionality has been extended. In addition to the area toll, regulated traffic areas of type 'No through traffic' and 'No traffic' can now be defined and taken into account in static assignments as well as in the simulation-based assignment (SBA). Regulated traffic areas are taken into account in the impedance function. A restriction to active areas is possible for the calculation of the impedance. In particular, the renaming of the network object affects the COM interface, since corresponding COM objects and methods have been renamed as well. **(16841 ⚠)**
- SBA - calibration of capacity downstream of merges: For the simulation-based assignment (SBA) a new node attribute has been introduced that enables calibration of capacity downstream of merges. The node attribute 'SBA penalty for merging vehicles' increase the minimum time between vehicles if they are entering the same destination lane but come from different origin lanes. **(22231)**
- SBA random number generator: The random number generator used in SBA has been replaced. **(22291 ⚠)**
- Setting for the design hourly volume at nodes: The option 'Volume PrT [PCU]' as the design hourly volume for the calculation of impedances at nodes has been removed. Instead the option 'Volume PrT with base volume [PCU]' is used and the settings for the base volume under PrT settings > Assignment is considered. **(21496 ⚠)**
- Usage of formula attributes in the PrT impedance function: When using formula attributes in the detailed impedance definition, they will be highlighted in yellow and a tooltip is being used to indicate restrictions when using volume-dependent attributes apart from tCur. **(18357)**

Procedure Sequence

- Copy & paste for procedures: Procedures can be copied from one version file to another via the clipboard. New context menu entries are available for this purpose. Copying can be carried out either for one or more marked procedure steps or for one or more marked groups. **(19280)**

PuT Assignment

- Headway-based assignment with a headway of zero: A headway of zero is not allowed in the headway-based assignment. The assignment will be aborted with an error message. **(22493 ⚠)**
- Messages for PuT assignment procedures: The output of messages when executing PuT assignments has been improved. **(21657)**
- Skim 'Path leg attribute' now uses path leg attribute: Previously, the 'Path leg attribute' skim used a time profile attribute for definition, contrary to its designation. Now, a path leg attribute is actually used, so that, for example, the vol/cap ratio of the vehicle journey items used can be evaluated. Only those indirect attributes are available whose value results from the assignment. **(21961)**
- Skim for adaptation time: The skim adaptation time is also available for analysis time intervals. **(21001)**
- Speed-up for constructing data structures for shortest path search: The construction of data structures containing shortest paths for PuTWalk and PuTAux has been accelerated. This has a particular effect when opening version files that contain public transport assignments. **(22104)**

Ride Sharing

- A vehicle that cannot serve new trip requests returns to a holding area. The selection of the area is no longer based on distance alone, but on a cost function. In addition to distance, this function includes the capacity, weight, and potential of the holding area. The current and future demand now influences the decision of which holding area is selected. **(22334)**
- Dispatching: A major extension of the dispatching algorithm now allows for more flexible service schemes: For each trip request, all pickup (resp. drop-off) locations within a certain walking time from the origin (resp. destination) can be considered for tour planning. This creates additional flexibility in vehicle dispatching and typically reduces the number of vehicles needed. The dispatcher will define the pickup and drop-off combination for a trip request.
The choice of the best-fitting pickup and drop-off can be controlled through a combination of the level of service (= short walk access and egress) and efficient vehicle usage (= short extra travel time) in one generalized cost function. **(21861)**
- Ideal travel distance: The tour planning procedure determines the parameter Ideal travel distance. This is stored on the public transport path leg and indicates the shortest distance to serve a trip request. **(20787)**
- Loops in vehicle tours: It is possible to correctly map loops of vehicle tours in the PrT path. Such loops occur when a vehicle departs from a node and is ordered back to the same node before reaching the next stop. A clean separation between idle and travel time is now possible in such cases. **(19791)**
- Tour planning: Optionally, serving all trip requests without stopover can be enforced during trip planning, i.e. only trip requests with the same pickup and drop-off nodes combination can be served together (time pooling). This is particularly relevant for VTOLs (air cabs) **(22140)**

Safety

- APM (Accident Prediction Model) attributes for sections: All APM attributes (APM accident count, APM accident density, APM accident rate, APM accident cost, APM accident cost density, APM accident cost rate) are now also available for sections. **(19575)**

Scenario Management

- ⊕ Access to currently loaded scenario: There is a new COM method at IProject that returns the currently loaded scenario as an IScenario object. **(16926)**
- ⊕ Calculation state and global layout: The calculation state also depends on the global layout. If the global layout has been changed, the calculation state is set to 'Calculated (not up-to-date)'. **(20993)**
- ⊕ Calculation times of scenarios: The Tab Scenarios contains three new attributes Calculation start time, Calculation end time, and Calculation duration. **(16622)**
- ⊕ Log-Entry about used version file: When creating a project, a log entry is created with the directory and name of the base version used. **(20866)**
- ⊕ Modifications and allocated scenarios: Under the tab Modification there are two new attribute 'Scenarios' and Scenarios (completed). The attribute 'Scenarios' lists the number of scenarios in which the modification is explicitly used the attribute 'Scenarios (completed)' displays the numbers of all scenarios including those in which a modification depends on another one. **(19459)**
- ⊕ Name of base version: The name of the base version can be changed under Tab 'Basic settings' > 'Project settings...'. **(12453)**

Subnetwork Generator

- ⊕ Unused stops: Stops that are located on active routes or nodes can now optionally be included in the subnet even if they are not served by active line routes. **(20302)**

Timetable Editor

- ⊕ Naming of regular services: Vehicle journey attributes and their relations can be used as a prefix for naming regular services. **(20492)**

Visum Files

- ⊕ Default encoding of text files: The default encoding of text files has been changed to UTF8. **(21242 ❗)**
- ⊕ Junction editor layout: The global layout has been extended. It also includes the view of the junction editor. Via the menu Junction editor > Open junction editor layout it is possible to read global layouts partially, i.e. with the information saved for the junction editor only. **(22884)**
- ⊕ Reading of older binary files: Reading binary files in the format before Visum 11.03 is no longer supported in Visum 2022. In addition to version files, this also applies to graphic parameter files, procedure parameter files, list layouts and filter files. **(22403)**
- ⊕ Reading of text files: UTF-32 encoded text files cannot be read anymore in PTV Visum. **(21901)**

❗ Breaking Changes

ANM

- ❗ Signal data: During the ANM export the content of the SC attribute 'Signal program data' are written into the ANM file to transfer data of signal controllers. From PTV Vissim 2022 the data of the attribute 'Signal program data' are imported for fixed time control. **(22523 ⊕)**

Add-Ins

- ❗ Crash when expanding 'wx' in the Python console: No more crash when displaying the possible values within the autocompletion when entering 'wx' (after an import statement 'import wx') in the Python console. Due to incompatible changes in the newer version of wx it may be necessary to adapt the code of your own Python applications. **(20946)**

COM-API

- ❗ Changed default regarding non-editable attributes for export methods: For the Visum.IO.SaveNet, Visum.IO.SaveDemandFile, Visum.IO.SaveAccessDatabase, Visum.IO.SaveToMsSqlServerDatabase and Visum.IO.SaveSQLiteDatabase methods, which all export data based on a specified layout file, the default of the 'editableOnly' parameter has been changed to 'false'. Thus, if the parameter is not set, all attributes specified in the layout file are actually exported, whereas previously the non-editable attributes were filtered out. With unchanged client code, the behavior changes accordingly if the parameter in question is not explicitly set in this code. **(22008)**
- ❗ Spelling of Property IAttribute.Category corrected: The spelling of Property IAttribute.Category has been changed. It was previously written in lower case. Depending on the target language, client code must be adapted. **(22687)**

Data Model

⚠ Display of attributes with percentages: Attributes that typically represent proportions (e.g. vol/cap ratio) are displayed in the format 'Percent' by default, whereby the floating point number is multiplied with 100. This changes results of these attributes, because the multiplication with 100 is not done until the display is in the format 'Percent'. **(21217 ⊕)**

⚠ Integration of daily plans with the calendar: Daily signal plans can now also be allocated to calendar days. The attribute 'Daily signal program list number' has been abolished, instead the daily signal plans allocated to calendar days can be viewed via the SC attribute 'Daily signal program list number per day (CDay)'. In the procedure 'Set signal times', the active signal program is now set for the respective calendar day. This eliminates the need for the daily plan number. **(22297 ⊕)**

⚠ Regulated traffic areas: The network object 'Toll systems' has been renamed to 'Regulated Traffic Areas' and the functionality has been extended. In addition to the area toll, regulated traffic areas of type 'No through traffic' and 'No traffic' can now be defined and taken into account in static assignments as well as in the simulation-based assignment (SBA). Regulated traffic areas are taken into account in the impedance function. A restriction to active areas is possible for the calculation of the impedance. In particular, the renaming of the network object affects the COM interface, since corresponding COM objects and methods have been renamed as well. Scripts must be adapted accordingly. If toll systems of the type area toll are defined, these are automatically taken into account in static assignments or SBA if the impedance component Toll-PrTSys is included. **(16841 ⊕)**

⚠ Volume capacity ratio attributes: The naming of the volume capacity ratio attributes has been standardized. The average ratio in the line hierarchy is now consistently referred to as 'MeanVolSeatCapRatio' or 'MeanVolTotalCapRatio'. The ratio at the line route- and travel time- profiles were named 'VolSeatCapRatio' and 'VolTotalCapRatio', respectively. At the links, the utilization of public transport is now called 'VolSeatCapRatioPuT' and 'VolTotalSeatCapRatio'. **(22130 ⊕)**

Demand Procedures

⚠ Calculation of the diagonal in the procedure P+R lot choice: When calculating the utility in the procedure P+R lot choice, the values of the diagonal were not calculated or initially set to zero. This error has been fixed. The values of the diagonal are now set to -99999. This can change calculation results in demand models with P+R. **(22062)**

⚠ Trip generation with negative savings in the freight demand calculation: If the values of savings become negative, then the transformed savings are set to zero regardless of the function type used. This means that tours from A to B via C back to A are not used, if they are more expensive than the sum of tours A-B-A and A-C-A . This can change results of the trip generation in the freight demand model. **(21870 ⊕)**

Dialogs

⚠ Encoding for text files: The options for encoding of text files in the user settings have been removed. The default UTF8 is now always used. This may result in changes in output files. **(22296 ⊕)**

Lists, COM-API

⚠ The previously implicitly connected lists for PrT paths from assignments (i.e. with demand segments) the one hand and user-defined paths (i.e. allocated to path sets) on the other hand have been separated at the user interface as well as in the COM interface. Therefore, in the 'Lists' menu under 'Paths' there are now separate entries to the lists 'PrT Paths' and 'PrT paths on link level' for the assignment paths and to the lists 'Path sets', 'Paths' and 'Path items' for the user-defined paths. Similarly, at the ILists object in COM via CreatePathList or CreatePathItemList the list for user-defined paths or their elements is opened. Switching the IPrTPathList by specifying a path set in the SetObjects method is no longer possible. **(18702 ⊕)**

PrT Assignment

⚠ Improvements for the method bi-conjugate Frank-Wolfe (BFW): The assignment method bi-conjugate Frank-Wolfe has been improved: Firstly, memory consumption has been reduced and secondly, the assignment fulfills the condition of proportionality across transport systems. This changes the assignment results. **(20009 ⊕)**

⚠ SBA lane selection on links with several pockets or channelized turns at the ToNode: On links to nodes with multiple pockets and/or channelized turns, unrealistic lane changes could occur. This error has been fixed. When entering a link, vehicles now already select lanes that allow them to turn at the to node of the link according to their route. This behavior could be achieved in PTV Visum 2021 using the UDA 'SBAUseLaneChoiceLookaheadForPockets' (ID 21780). The UDA is now no longer required. This changes SBA assignment results. **(22308)**

⚠ SBA random number generator: The random number generator used in SBA has been replaced. This changes the results of SBA. **(22291 ⊕)**

⚠ Setting for the design hourly volume at nodes: The option 'Volume PrT [PCU]' as the design hourly volume for the calculation of impedances at nodes has been removed. Instead the option 'Volume PrT with base volume [PCU]' is used and the settings for the base volume under PrT settings > Assignment is considered. Calculation results can change if the settings for the design hourly volume at nodes was not in line with the settings for the base volume of (main) turns. **(21496 ⊕)**

PuT Assignment

⚠ Headway-based assignment with a headway of zero: A headway of zero is not allowed in the headway-based assignment. The assignment will be aborted with an error message. This changes assignment result or the assignment cannot be executed without adjusting the headway. **(22493 ⊕)**

Ride Sharing

⚠ Pre-booking time on the previous day: If demand exists early in the day, the creation time of the associated trip requests can be on the previous day. This case was previously not mapped correctly, resulting in distributions of the pre-booking time not being respected. This error has been fixed. In return, the maximum possible pre-booking time has been reduced from 48h to 23h 59m 59s. In previous Visum versions, the import from PTV MaaS Modeller can no longer be used to import tour planning results in which individual trip requests occur with an origin time before the day change. **(22510)**

Visum Files

⚠ Default encoding of text files: The default encoding of text files has been changed to UTF8. This can change output files, e.g. .net and .att files. **(21242 ⊕)**

Other Procedures

⚠ Integration of daily plans with the calendar: Daily signal plans can now also be allocated to calendar days. The attribute 'Daily signal program list number' has been abolished, instead the daily signal plans allocated to calendar days can be viewed via the SC attribute 'Daily signal program list number per day (CDay)'. In the procedure 'Set signal times', the active signal program is now set for the respective calendar day. This eliminates the need for the daily plan number. **(22297 ⊕)**

PrT Assignment

⚠ Regulated traffic areas: The network object 'Toll systems' has been renamed to 'Regulated Traffic Areas' and the functionality has been extended. In addition to the area toll, regulated traffic areas of type 'No through traffic' and 'No traffic' can now be defined and taken into account in static assignments as well as in the simulation-based assignment (SBA). Regulated traffic areas are taken into account in the impedance function. A restriction to active areas is possible for the calculation of the impedance. In particular, the renaming of the network object affects the COM interface, since corresponding COM objects and methods have been renamed as well. Scripts must be adapted accordingly. If toll systems of the type area toll are defined, these are automatically taken into account in static assignments or SBA if the impedance component Toll-PrTSys is included. **(16841 ⊕)**